THE PLANT DISEASE REPORTER

Issued By

CROPS RESEARCH DIVISION

AGRICULTURAL RESEARCH SERVICE

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ROOTROT AND RELATED LITERATURE

AN ANNOTATED BIBLIOGRAPHY, 1957

Supplement 252 December 15, 1958

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Crops Research Division serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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THE PLANT DISEASE REPORTER

MYCOLOGY AND PLANT DISEASE REPORTING SECTION

Crops Protection Research Branch Plant Industry Station, Beltsville, Maryland

ROOTROT AND RELATED LITERATURE

AN ANNOTATED BIBLIOGRAPHY, 1957

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We have prepared the following annotated bibliography from references appearing in periodicals published in 1957. The purpose is to facilitate rootrot research and emphasise its importance as a distinct entity in plant pathology. We also hope that this list will help investigators avoid unnecessary duplication of effort in searching the literature. It is our intention to repeat this work at least one more year. In the meantime, we invite your comments.

-- The Authors

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See also 81, 509

1. ALLEN, J. D. The development of potato skin-spot disease. Ann. Appl. Biol. 45: 293-298. 1957.
In Kerr's Pink (var.) humid conditions, both before and after infection by Oospora pustulans, increase the incidence of the disease.

2. BOYD, A. E. W. Field experiments on potato skin-spot disease caused by Oospora pustulans Owen & Wakef. Ann. Appl. Biol. 45: 284-292. 1957.
Potato varieties vary from susceptible to highly resistant. The efficacy of an organo-mercury dip treatment at lifting time was confirmed.

3. DOUGLAS, R. J. and C. L. SAN CLEMENTE. Some observations on the metabolism of Streptomyces scabies. Can. J. Microbiol. 3: 905-910. 1957.
This research was developed with a view towards a possible explanation of the pathogenic activities of Streptomyces scabies on a biochemical basis. It was found that in the presence of the dye 2,6-dichlorophenol indophenol crude extracts of alumina-ground or of sonically disrupted mycelium of Streptomyces scabies catalyzed dehydrogenase reactions with the substrates succinate, citrate, malate, and glutamic acid.

4. JOHNSON, GESTUR and LAWRENCE A. SCHAAL. Chlorogenic acid and other orthodihydricphenols in scab-resistant Russet Burbank and scab-susceptible Triumph potato tubers of different maturities. Phytopathology 47: 253-255. 1957.
Concentration of chlorogenic acid and the total o-dihydricphenols was much higher in periderm of tubers of the scab-resistant variety Russet Burbank than in that of tubers of the scab-susceptible variety Triumph. Greatest difference between the varieties was found at the stage in which the tubers were growing most rapidly.

5. LITZENBERGER, S. C. and J. A. STEVENSON. A preliminary list of Nicaraguan plant diseases. Plant Dis. Reptr. Suppl. 243. 1957.
Reports Streptomyces (Actinomyces) scabies on potatoes.

6. MENZIES, J. D. Control of potato scab by a scab-suppressing factor in certain soils. Phytopathology 47: 528. 1957.
Certain soils of the Yakima Valley, Washington, have a suppressing effect on potato scab. A striking reduction in the incidence of scab in a heavily infested soil was obtained by adding 1 percent by weight of scab-suppressing soil plus 1 percent by weight of chopped alfalfa hay.

7. PLANT QUARANTINE ANNOUNCEMENTS: CYPRUS. F.A.O. Pl. Prot. Bull. 5: 177-179. 1957.
With reference to importation (a) if the shipment of tubers contains more than 10 percent of the tubers with more than 10 percent of the surface affected by common scab (Actinomyces scabies), the consignment will be subject to disinfection, treatment, destruction, or re-exportation (b) the crop producing the seed potatoes must have been located at least 2 kilometers from any place where potato wart or ring rot (Corynebacterium sepedonicum) has occurred at any time.

ANTIBIOTICS
See also 415, 422

8. ABO EL DAHAB, M., and C. E. COX. Studies of certain nutritional requirements of Chloromycetin-resistant, Chloromycetin-susceptible, pathogenic and non-pathogenic isolates of Pseudomonas solanacearum. (Abstr.) Phytopathology 47: 1. 1957.
Strains showing varying degrees of resistance to the antibiotic were isolated from a tobacco and a tomato strain of Pseudomonas solanacearum by prolonged incubation with chloromycetin and were found to show variations in nutritional requirements. No correlation was found between pathogenicity

and chloromycetin resistance and no differences in nutritional requirements were found between strains of differing pathogenicity.

9. ANDRÉN, F. and B. OLOFSSON. Kombinerat betnings- och besprutningsförsök mot ringröta på Potatis. (Combined disinfection and spraying experiments against potato ring rot.) Växtskyddsnotiser, Stockholm, 21: 26-27. 1957. (Rev. Appl. Mycol. 36: 784-785. 1957.)

Potatoes infected by ring rot (Corynebacterium sepedonicum) were immersed for one hour in Acti-dione (100 mg/liter). These were planted out in plots (100 in each) and sprayed three times with Acti-dione (25 ppm). About 3 weeks before lifting, the haulms in half of the plot were killed with 10 percent sulfuric acid. Immersion in the antibiotic reduced the incidence of ring rot on an average by some 45 percent, but neither spraying with Acti-dione nor haulm-killing was effective by itself.

10. ARK, PETER A. and W. S. SIBRAY. Efforts to control crown gall of roses with antibiotics. Plant Dis. Reptr. 41: 449-451. 1957.

Some control of crown gall (Agrobacterium tumefaciens) of roses was obtained in cuttings with 2-hour streptomycin dips containing 500 and 600 ppm. No satisfactory control was shown by streptomycin dusts up to 2000 ppm. Tetracycline (100 ppm) was effective to a degree on certain rose varieties.

11. CARTER, H. P., and J. L. LOCKWOOD. Lysis of fungi by soil microorganisms and fungicides including antibiotics. Phytopathology 47: 154-158. 1957.

A photometric method was used to determine changes or density of mycelium. A comparison was made of the lytic action of certain streptomycetes, of antibiotics, and of fungicides. The first showed the greatest lytic action, lysing both living and dead mycelium.

12. CARTER, H. P., and J. L. LOCKWOOD. Lysis of fungi by Streptomyces isolates and fungicides. (Abstr.) Phytopathology 47: 5. 1957.

Zones of lysed mycelium were produced around Streptomyces colonies that developed when soil suspensions were sprayed on agar media containing cultures of Glomerella cingulata, Helminthosporium sativum, Fusarium oxysporum f. lycopersici, Rhizoctonia solani, Verticillium albo-atrum and others. Streptomyces isolates lysed both living mycelium and mycelium killed by heat and chloroform, whereas fungicides lysed only living mycelium.

13. CRAVERI, R. and G. GIOLITTI. An antibiotic with fungicidal and insecticidal activity produced by Streptomyces. Nature 179: 1307. 1957.

Dilutions of "flavensomycin" isolated from Streptomyces tonaschiensis, in the region of 0.05 μgm/ml are active against Saccaromyces among yeasts and Penicillium among the filamentous fungi.

14. EPPS, WILLIAM M. Control of potato seed piece decay in South Carolina 1952-1956. Plant Dis. Reptr. 41: 148-150. 1957.

Streptomycin treatment, either liquid dips or dusts, of the freshly cut seed resulted in good control of seed piece decay (caused by Erwinia atroseptica and E. carotovora) as measured by the effect of treatment on the stands and yields obtained.

15. GATTANI, M. L. Studies on the control of damping-off of safflower with antibiotics. Plant Dis. Reptr. 41: 160-164. 1957.

Out of five antibiotics tested for the inhibition of five root-rotting fungi in vitro, Acti-dione, patulin and filipin gave promising results. As Acti-dione and patulin proved to be phytotoxic to safflower seeds and seedlings, filipin was used for studies on the control of the damping-off phase of the root rot of safflower caused by an unidentified species of Pythium in Alberta. Seed treatment of safflower with different concentrations of filipin for varying periods did not control the disease.

16. KEYWORTH, W. G. Streptomycin for control of silvering disease, Corynebacterium

betae, of red beet. Ann. Appl. Biol. 45: 215. 1957.

Streptomycin treatment of seed considerably reduced this disease in the field.

17. LOGSDON, CHARLES E. The effects of certain antibiotics on potato production and ring rot control in Alaska. (Abstr.) Phytopathology 47: 22. 1957.

Agri-mycin 100 at 1000 ppm gave good control of potato ring rot in the field and in storage. At the same time it decreased yields considerably. Agritracin had no effect on the disease.

18. MILLER, PAUL R. (compiler). Tests with antibiotics for control of rose crown gall. Agr. Chem. 12: 57-58. 1957.

Practices that result in root injuries are important factors in infection. The paper discusses precautionary measures to be taken during transplanting as well as a program of antibiotic dip treatments for prevention.

19. SMITH, GLENN E. Inhibition of Fusarium oxysporum f. lycopersici by a species of Micromonospora isolated from tomato. Phytopathology 47: 33. 1957. Phytopathology 47: 429-432. 1957.

A conidial and mycelial suspension of Micromonospora sp. was mixed with warm agar in Petri dishes. Fusarium oxysporum f. lycopersici was completely inhibited when transferred to this agar 1 day or more later. When added to potato-dextrose agar, a 50 percent dilution of a crude filtrate of the Micromonospora sp. inhibited F. oxysporum f. lycopersici.

20. SMITH, J. DREW. The use of griseofulvin against dollar spot and Fusarium patch diseases of turf. Ann. Appl. Biol. 45: 206-208. 1957. (J. Sci. Food Agr. 8: Abstracts ii-131. 1957.)

Application of griseofulvin in aqueous solution at 220-880 μg/ml to turf decreased the extent of dollar spot and Fusarium patch in proportion to the amount applied in tests in which the disease was started by inoculation with liquid cultures. In practical tests on bowling greens griseofulvin (wettable powder) showed some protective activity against dollar spot infection.

21. THORNTON, H. G. Report of the Rothamsted Experimental Station for 1956, 280 p., 1957. (Rev. Appl. Mycol. 36: 816. 1957.)

Evidence was obtained of a fungistatic substance (or substances), destroyed by heat, that inhibits spore germination in soil.

22. VERONA, O. and P. GAMBOGI. Intorno all'azione antimicotica della nistatina. I. Azione su Aspergilli, Penicilli e funghi fitopatogeni. (On the antifungal action of nystatin. I. Action on Aspergillus, Penicillium, and phytopathogenic fungi.) Ann. Sper. agr., N.S. 11: 193-209. 1957. (Eng. summary) (Rev. Appl. Mycol. 36: 543-544. 1957.)

Nystatin, an antibiotic substance present in the mycelium of Streptomyces noursei, used in the form of a therapeutic preparation mycostatin, retarded or inhibited the growth of 24 species of Penicillium, and 11 of Aspergillus, as well as of numerous phytopathogenic fungi. It did not appear to be toxic to the aerial parts of plants. Application via the roots growing in solutions in some cases slightly retarded the growth of the underground parts and (when the application was heavy) of the aerial parts.

23. WHITE, N. H. Antibiosis in plant pathology. Aust. J. Sci. 19: 7-9. 1957. (Rev. Appl. Mycol. 36: 775. 1957.)

Attention is drawn to the need for a wider but nevertheless precise concept of "antibiosis", especially in relation to plant diseases. There are apparently three ways, depending on their source, in which antibiotics may modify the pathogen-host relationship. Thus, the pathogen may secrete a substance antagonistic to the host; the latter may produce a substance injurious to certain of its pathogens; and micro-organisms may secrete substances antibiotic to a given pathogen, thereby influencing the incidence and severity of the disease which it causes. Evidence supporting the existence of each of these

types of antibiotic action is summarized from 25 contributions to the literature.

24. WRIGHT, J. M. and J. F. GROVE. Production of antibiotics in soil. V. Breakdown of griseofulvin in soil. Ann. Appl. Biol. 45: 36-43. 1957. (J. Sci. Food Agr. 8: Abstracts ii-123. 1957.)
When added to a garden loam griseofulvin disappeared rapidly after an initial lag. A Pseudomonas sp. increased in soil after addition of griseofulvin.

BACTERIA

See also 7, 8, 9, 10, 14, 16, 17, 18, 74, 180, 181, 182, 187, 189

25. AVIGAD, G. and D. S. FEINGOLD. Fructosides formed from sucrose by a Corynebacterium. Arch. Biochem. Biophys. 70: 178-184. 1957.
The predominant glycosidic linkage was of the type 2 beta: 6, the branch linkage 2 beta: 1, and the basal chain length 15. 1^F-beta-fructosylsucrose was the major oligosaccharide formed during levan synthesis from sucrose by the Corynebacterium sp.

26. BAKKER, MARTHA. Bacterieverwelkingsziekten van anjers. (Bacterial wilt diseases of carnations.) Tijdschr. PlZiekt. 63: 20-21. 1957. (Rev. Appl. Mycol. 36: 589. 1957.)
Carnation bacterial wilt disease in the Netherlands has been attributed to Pseudomonas caryophylli. The disease in Denmark has now been attributed to Erwinia carotovora f. sp. dianthicola. The above paper differentiates between these two.

27. BINOT, NOELLE. Les parasites et ennemis des dahlias. (Diseases and pests of dahlias.) Jardins de Fr. 4: 153-159. 1957. (Rev. Appl. Mycol. 36: 763. 1957.)
Mentioned inter alia are infections by Corynebacterium fascians, Agrobacterium tumefaciens, Erwinia cytolytica (E. carotovora), and Pseudomonas solanacearum.

28. BONDE, R. and J. S. GELCHELL. Survival of ring-rot bacteria in wet potato pulp from the starch factories. Amer. Potato J. 34: 133-135. 1957.
Ring-rot bacteria (Corynebacterium sepedonicum) in wet potato pulp from a starch factory will mostly die in storage after 3 to 7 days but a few may survive for as long as 17 days at 40° F. Temperatures of 50° to 55° were less favorable for survival.

29. BURKE, DOUGLAS W. Bacterial wilt of pinto beans on soils of different types and cropping histories. Plant Dis. Reptr. 41: 671-673. 1957.
Wilt caused by Corynebacterium flaccumfaciens or C. flaccumfaciens var. aurantiacum was much less on clay loam than on sandy loam, possibly because of suppressive action of competitive microflora upon the pathogen in the finer textured soil.

30. COX, R. S., V. J. CARROLL, and R. A. BENEDICT. Studies on the etiology and control of the radish pit disease. (Abstr.) Phytopathology 47: 7. 1957.
Radish pit, a storage and transit disease, is a serious threat to the radish industry in Florida. Constant association of bacteria with lesions and control with antibiotics suggested a bacterial etiology. Control was obtained following (among others) a 5-minute dip treatment with Terramycin at 40 ppm.

31. ERDMAN, LEWIS W., HERBERT W. JOHNSON, and FRANCIS CLARK. Varietal responses of soybeans to a bacterial-induced chlorosis. Agron. J. 49: 267-271. 1957.
Certain soybean varieties developed a chlorosis when inoculated with selected strains of Rhizobium japonicum while other soybean varieties showed normal growth when similarly treated. Soybean varieties showing chlorosis after inoculations with selected strains of R. japonicum failed to show chlorosis when grown in association with other Rhizobia. The evidence is substantial that bacterial-induced chlorosis in soybeans is linked to varietal susceptibility.

32. GARBER, E. D. and SUSAN G. SHAEFFER. Free histidine content of turnip varieties and their resistance to histidine requiring mutants of Erwinia aroideae. J. Bact. 74: 392-395. 1957.

A correlation was found between resistance in turnip and a relatively low histidine concentration. Where this correlation broke down the authors explained it on the basis of the expression of an amine antaorganism or inhibition.

33. GOTTLIEB, DAVID, MICHELINA ROMOLI, and MARIO ROGERS. Alfalfa wilt in Chile. Plant Dis. Reptr. 41: 1041-1044. 1957.

A widespread wilt disease of alfalfa in Chile was shown to be similar to bacterial wilt of alfalfa caused by Corynebacterium insidiosum. The amount of damage was greatest in old fields. All commercial varieties of alfalfa being grown showed symptoms of the wilt. The ultimate aim is to breed varieties of alfalfa resistant to the wilt which are suited to Chilean conditions.

34. GYLLENBERG, H. G. Seasonal variations in the composition of the bacterial soil flora in relation to plant development. Can. J. Microbiol. 3: 131-134. 1957.

At the beginning of the season the soil flora was different from that of the rhizosphere. However, it was successively changed, and became, toward the end of the season, similar in composition to the rhizosphere population. This change was due to the development of roots and to a migration from the rhizosphere into the soil.

35. HARRISON, D. E. Bacterial wilt of potatoes caused by Pseudomonas solanacearum E.F.S., including a comparison of Victorian and other strains of the organism with the ring rot bacterium, Corynebacterium sepedonicum (Spiek and Kotth.) Skapt. and Burk. Thesis. Austral. Inst. Agric. Sci. J. 23: 160. 1957.

36. HUSAIN, A. Mode of pathogenesis of the Granville wilt bacterium, Pseudomonas solanacearum. Ann Arbor, Mich. Univ. Microfilms Pub. 21: 894. 1957. (Diss. Abst. 17: 1649-1650. 1957)

The highly pathogenic strain (F_1) caused rapid wilting and death of host plants, the weakly pathogenic strain (B_2) did not induce wilting but caused yellowing and stunting, and the virulent strain (B_1) produced no external symptoms. Preliminary chemical analysis of the wilt-inducing substance from culture filtrate indicated that it was a complex polysaccharide. Pectic and cellulytic enzymes increase the severity of wilting by disorganization of vascular tissue.

37. LAMBINA, V. A. Distribution of soil bacteria decomposing vegetable protopectin on the fields with grass-crop rotation. Mikrobiologiya 26: 66-74. 1957.

Bacteria of the protopectin age group were present in the rhizosphere and the root systems of ordinary winter wheat, clover, timothy grass, oats, flax, potatoes, cabbage, peas, and tomatoes.

38. LAPWOOD, D. H. Studies in the physiology of parasitism. XXIII. On the parasitic vigour of certain bacteria in relation to their capacity to secrete pectolytic enzymes. Ann. Bot., London N.S. 21: 167-184. 1957. (Rev. Appl. Mycol. 36: 458. 1957.)

The failure of nonpathogenic bacteria to attack normal potato tissue was attributed to their slower rates of growth and enzyme production, which allow the tissues sufficient time for protective suberization.

39. LIHNELL, D. Några olika potatissorters förhållande till ringröta. (The reaction of some different potato varieties to ring rot.) Växtskyddsnotiser, Stockholm, 21 (2): 28-30. (Rev. Appl. Mycol. 36: 785. 1957.)

Tested 14 varieties to ring rot (Corynebacterium sepedonicum). The type wilting in the infected plants was variable but in the final analysis it was nonspecific. The tubers were lifted and, from time to time, examined in storage for symptoms of ring rot. The results were variable. Most varieties were severely infected, exceptions being Alpha, Elsa, Anna, and President. In variety Stockholm, bacteria penetrated the hilum and entered the vascular ring

and also entered directly into the flesh.

40. MURANT, A. F. and R. K. S. WOOD. Factors affecting the pathogenicity of bacteria to potato tubers. I. Ann. Appl. Biol. 45: 635-649. 1957.

The effect of potato extracts on the growth of four species of bacteria, one pathogenic (Erwinia aroideae) and three nonpathogenic (Pseudomonas syringae, Pseudomonas sp., and Flavobacterium sp.), and on the properties of their culture filtrates, was studied. It was shown that in some respects the pathogen Erwinia aroideae, and the three nonpathogens, behaved differently in vitro; these differences, if they occurred in vivo, could account, in part at least, for differences in pathogenicity. The factors which are probably important are the rates at which these organisms grew and produced macerating enzymes.

41. MURANT, A. F. and R. K. S. WOOD. Factors affecting the pathogenicity of bacteria to potato tubers. II. Ann. Appl. Biol. 45: 650-663. 1957.

Rates of suberization of the outer cells and of periderm development, or the addition of growth-regulating substances, had little effect on rotting. The water content of the tissues greatly affected the pathogenic capabilities of the very weak pathogens, Pseudomonas sp., Flavobacterium sp., and Pseudomonas syringae. The nonpathogenic bacteria caused active rots when the outer surfaces of tubers were sealed with vaseline. Temperature was important. Moisture was of real importance in pathogenicity of one of the nonpathogenic (weakly pathogenic) bacteria.

42. PHILIPSON, M. N. and I. D. BLAIR. Bacteria in clover root tissue. Can. J. Microbiol. 3: 125-129. 1957.

This paper reports bacteria (five kinds) that were isolated from the inner tissue of apparently healthy clover roots.

43. PLANTESYGDOMME I DANMARK 1954. ÅRSOVERSIGT SAMLET VED STATENS PLANTEPATOLOGISKE FORSØG, LYNGBY. (Plant diseases in Denmark 1954. Annual report compiled by the State Phytopathological Experiment Station, Lyngby.) Tidsskr. Planteavl. 60: 553-611. 1957. (Rev. Appl. Mycol. 36: 513. 1957.)

Infection of potatoes by Erwinia atroseptica was more severe than for many years, with incidence up to 10 percent.

44. SCHUSTER, M. L. and D. W. CHRISTIANSEN. An orange-colored strain of Corynebacterium flaccumfaciens causing bean wilt. Phytopathology 47: 51-53. 1957.

Although it primarily attacks above ground parts of the plant, this bacterium, C. flaccumfaciens var. aurantiacum n. var., is able to attack through the roots also. Attempts to create wilt symptoms by application of a bacterial suspension to the soil produced diverse effects, depending on whether sterilized or nonsterilized soil was used. Infection occurred in nonsterilized soil but not in sterilized soil.

45. STARR, G. H. and L. R. FINA. Effect of temperature on bacterial inoculum from ring-rot-infected tubers as shown by staining tests and by inoculum studies. Amer. Potato J. 34: 94-96. 1957.

A suspension of potato ring-rot bacteria (Corynebacterium sepedonicum) kept at 38° F could be used for inoculating tubers after 48 hours without much loss of viability, whereas at 83° F it deteriorated rapidly after 10 hours and induced no ring-rot symptoms.

46. TSUJITA, M. and C. MATSUI. Studies on the lysogenicity of Pseudomonas solanacearum with special reference to the new type phage produced from a doubly lysogenic strain. Jap. J. Genet. 32: 113-123. 1957. (In English).

Some doubly lysogenized S-9 (T-c200) bacteria liberate phage with a new type of host range. By infection with both S-9 and T-c200 phage, nonlysogenic S-IX bacteria can be changed into doubly lysogenic S-IX (S-9 T-c200) forms. In the doubly lysogenic bacterial strain thus formed, the new type of phage is also produced. It is concluded that recombination occurs only at the time

the doubly lysogenic state is initiated.

CHYTRIDS

47. HEY, A. Zur Rassenanalyse des Kartoffelkrebses (Synchytrium endobioticum (Schilb.)) Perc. (On the racial analysis of potato wart, Synchytrium endobioticum (Schilb.)) Perc.) Z. PflKrankh. 64: 425-457. 1957. (Rev. Appl. Mycol. 36: 781. 1957.)
Independent physiologic races (besides the so-called "normal" type) now total five in the German Democratic Republic.

48. SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC. POTATO WART DISEASE IN EUROPE AND THE MEDITERRANEAN BASIN IN 1956. Paris, European and Mediterranean Plant Protection Organization XI: 9 pp. 1957.
A general review of the potato wart disease situation in Europe in 1956 is followed by notes on its occurrence in the various countries considered separately.

49. ULLRICH, JOHANNES. Physiologic specialization of Synchytrium endobioticum. F.A.O. Pl. Prot. Bull. 5: 181-187. 1957.
Occurrence and spread of new biotypes; biotype analysis; resistance to biotypes; physiologic characteristics of new biotypes; phytosanitary measures.

50. WALKER, J. Two chytrid diseases of subterranean clover in New South Wales. Aust. J. Sci. 19: 207. 1957. (Rev. Appl. Mycol. 36: 702. 1957.)
From the Biological Branch, New South Wales Department of Agriculture, Sydney, the author reports the occurrence on the same subterranean clover plants of galls caused by Synchytrium aureum and Physoderma trifolii.

CONTROL

See also soil fungicides, etc.

Control -- Crop Manipulation

51. DEEMS, R. E. Black root of sugar beets as influenced by various cropping sequences and their associated mycofloras. Diss. Abstr. 17: 956. 1957.
Strikingly different mycofloras developed during one season's cropping of lucerne, maize, oats, blue-grass/rye-grass mixture, or sugar beets, following two seasons of sugar beets. Fungi were different in frequency of isolation, but in general the same kinds were isolated from all soils. Control of black root in sugar beets could be correlated with the occurrence of groups of specific saprophytic fungi, e.g., increase of total penicillia, P. funiculosum, series Thom, P. janthinellum, series Thom, and P. rugulosum Thom were associated with decreasing black root, and of Acrostalagmus spp. and Gliocladium roseum (Link) Thom with increasing black root. The isolation procedures and the possible importance of the mycofloras associated with the different crops are discussed.

52. HANSEN, L. R. and K. AASTVEIT. Forgrødeforsøk på fotsykesmittet jord. (Crop rotation experiments on foot-rot infected soil.) Norsk. Landbr. 1957, 7: 139, 142; 8: 157-159. 1957. (Rev. Appl. Mycol. 36: 520-521. 1957.)
A study to determine the effect of the preceding crops in a rotation on the incidence of Ophiobolus graminis and Cercosporella herpotrichoides on Norrøna wheat and Domen barley. Both suffered heavy yield reductions when preceded by the same cereals. Neither fungus attacked Blenda oats and this crop may therefore be recommended as a forerunner of wheat or barley

53. MENON, S. K. and LANSING E. WILLIAMS. Effect of crop, crop residues, temperature, and moisture on soil fungi. Phytopathology 47: 559-564. 1957.
Mycofloras of soil were different after four successive croppings of

alfalfa, corn, oats, or wheat. Highest numbers of colonies of Penicillium funiculosum series and P. purpurogenum series, for example, were isolated from corn soil. The mycofloras of soil cropped to corn and oats were different from soils amended with the residues of these crops. It appears that the crop plant is a decisive factor influencing soil mycofloras. The mycofloras associated with different crops appear to be characteristic; therefore, the use of crop sequences is an effective and practical method of altering soil mycofloras.

54. WILLIAMS, W. A. and D. RIRIE. Production of sugar beet following winter green manure cropping in California. I. Nitrogen nutrition, yields, diseases and pest status of sugar beet. Proc. Soil Sci. Am. 21: 88-92, 92-94. 1957.

The green manure and fertilizer treatments had no effect on stands, but reduced the incidence of dry rot canker.

55. YOUNG, ROY A. and W. J. TOLMSOFF. Cultural and chemical treatments for control of the early maturity disease of potatoes. (Abstr.) Phytopathology 47: 38. 1957.

The disease was partially but not effectively controlled by applying optimum quantities of nitrogen fertilizers, by crop sequences involving cereals as a preceding crop, and by seed-piece treatment with dichlone or Semesan Bel. Soil treatment with 190 pounds of Vapam per acre was extremely effective in 1955.

Control -- Miscellaneous

56. DURBIN, RICHARD D., E. F. FROLICH, and G. A. ZENTMYER. Hot-water treatment of avocado seed for the eradication of Phytophthora cinnamomi. Plant Dis. Reptr. 41: 678-680. 1957.

Avocado root rot caused by Phytophthora cinnamomi has become the most important disease of this crop in California. Using seed treated with hot water at 120° to 125° F for 30 minutes eliminates the possibility of introducing the pathogen into the nursery on seed, even though it might have been originally infected.

57. GARREN, K. H. and G. B. DUKE. The peanut stem rot problem and a preliminary report on interrelations of non-dirting weed control and other practices to stem rot and yield of peanuts. Plant Dis. Reptr. 41: 424-431. 1957.

Infection of groundnuts by Sclerotium rolfsii was less and yield greater when "non-dirting" weed control was practised than when weeds were smothered by throwing soil on the crop. PCNB applied as a soil drench at 12 pounds per acre 10 weeks after planting reduced aboveground infection and damage to pods and kernels. Deep burial of surface litter in an infested field reduced stem rot and increased yield in Virginia Bunch 46-2.

58. HILBORN, M. T., PAUL R. HEPLER and G. F. COOPER. Effect of polyethylene mulch on soil-borne pathogens of lettuce. (Abstr.) Phytopathology 47: 245. 1957.

Both black and white polyethylene mulches gave good control of slime rot (Pseudomonas sp.). Neither mulch affected the distribution or size of the root system, the date of maturity, or the size or weight of the head.

59. IVANOFF, S. S. Factors relating to the water-soak method of plant disease control. (Abstr.) Phytopathology 47: 525. 1957.

In studies on the effect of the water-soak method on the control of fungi on unshelled peanuts and of seedling blight of oats (Helminthosporium sativum), the most important factor in disease control seemed to be the removal from the substratum (seed coats, glumes or shells), through the process of diffusion, of nutrients necessary for germination and growth of the pathogens. The healthiest seedlings were those produced from seeds soaked in salt water or in sea water.

60. LLOYD, P. J. and D. F. CROSSAN. Irrigation and disease control: tomato anthracnose and potato seed-piece decay. (Abstr.) Phytopathology 47: 452. 1957.

In potato seed piece decay (caused by Erwinia carotovora) seed pieces were cut and treated before planting with various chemicals. In untreated rows, irrigation gave a lower stand. All chemical treatments gave a significantly better stand than did the check (untreated) only under irrigated conditions.

61. MACHACEK, J. E. Prevalence of Helminthosporium sativum, Fusarium culmorum and certain other fungi in experimental plots subjected to various cultural and manurial treatments. Can. J. Pl. Sci. 37: 353-365. 1957.

Sixty-two genera of micro-fungi were found in the soil of experimental plots during a 7-year period of sampling. The total for two parasitic fungi (Helminthosporium sativum and Fusarium culmorum) usually associated with common root rot of cereals, was only 0.5 percent. Variation in soil temperature and rainfall during the soil-sampling period did not affect the number of fungus colonies that appeared on the dilution plates; neither did crop rotation nor soil fertilization. However, the location of a plot in the experimental field did affect the number of colonies of two species of Penicillium, and the pattern of their occurrence, although different for each fungus, was consistent from year to year.

62. RISHBETH, J. and A. G. NAYLOR. Fusarium wilt of bananas in Jamaica. III. Attempted control. Ann. Bot. 21: 598-609. 1957.

Soil disinfection by fumigants was unpromising. Flood-fallowing is not practicable in the West Indies. Addition of lime, phosphate and potash separately or in combination had little or no effect, while nitrogen often caused an earlier appearance of wilt. Green manures and compost were also ineffective.

63. ROISTACHER, CHESTER N., K. F. BAKER and J. G. BALD. Hot water treatment of gladiolus cormels for the eradication of Fusarium oxysporum f. gladioli. Hilgardia 26: 659-684. 1957.

Heat therapy of gladiolus cormels was found to be a practical commercial means of securing pathogen-free planting stock. Thermal inactivation temperatures of dormant cormels of six varieties and their pathogens are indicated.

FUNGI

64. ARNDT, C. H. Temperature as a factor in the infection of cotton seedlings by ten pathogens. Plant Dis. Reptr. Suppl. 246. 1957.

Cotton seeds naturally infested by or artificially inoculated with ten fungi were grown in culture at 18°, 21°, 24°, 30°, 33°, and 36° C. The temperature range through which the several fungi infected the seedlings was noted and recorded and the characteristics of the lesions produced by the several fungi are described.

65. BALD, J. G. and PHILIP A. CHANDLER. Reduction of the root rot complex on Croft lilies by fungicidal treatment and propagation from bulb scales. Phytopathology 47: 285-291. 1947.

After nematodes and Rhizoctonia solani Kuehn were eliminated, F. oxysporum Schlecht., Pythium ultimum Trow, and bacteria were isolated from diseased plants. Inoculation tests indicated the occurrence of pathogenic and nonpathogenic clones of R. solani and F. oxysporum. A clone of P. ultimum was also pathogenic. Except where mites and nematodes were involved, these three organisms appeared mainly responsible for the rotting and discoloration of underground plant parts of field and greenhouse lilies. A balance seems to exist between P. ultimum and F. oxysporum as root rot pathogens. In the field, the environment favors Pythium; forcing conditions in the greenhouse are sometimes more favorable for Fusarium.

66. BUXTON, E. W. Report of the Rothamsted Experiment Station for 1956, 280 pp., 1957. (Rev. Appl. Mycol. 36: 816. 1957.)

Several fungi were isolated from roots of sugar beets affected with "docking disorder". Of eight fungal species inoculated to beet seedlings in compost adjusted to pH levels of 5.3, 6.5, and 8, only Fusarium oxysporum and Pythium caused damage. Symptoms were more pronounced in acid than in alkaline soils.

67. ELAROSI, HUSSEIN. Fungal associations. I. Synergistic relation between Rhizoctonia solani Kühn and Fusarium solani Snyder and Hansen in causing a potato tuber rot. Ann. Bot. N.S. 21: 555-567. 1957.

Rhizoctonia solani and Fusarium solani caused extensive rotting of potato tubers when the two were used together in inoculations and when R. solani was inoculated first. A synergistic relationship was found between these fungi.

68. ELAROSI, HUSSEIN. Fungal associations. II. Cultural studies on Rhizoctonia solani Kühn, Fusarium solani Snyder and Hansen, and other fungi, and their interactions. Ann. Bot. N.S. 21: 569-585. 1957.

After being used by Rhizoctonia a potato mash medium gave better growth of Rhizoctonia and Fusarium than it did when the medium was initially used by Fusarium. The range of pH values suitable for Rhizoctonia growth was narrower than that for Fusarium, optimum values being 5.9 for the former and 7.8 for the latter. A study of various carbon sources showed that poor growth of Rhizoctonia was obtained when pectin was used as the sole source of carbon. Both the extract of Fusarium mycelium, grown on vitamin-free medium, and the Fusarium-spent medium, stimulated the growth of Rhizoctonia on vitamin-free medium.

69. ERWIN, DONALD C. Fusarium and Verticillium wilt diseases of Cicer arietinum. (Abstr.) Phytopathology 47: 10. 1957.

A Fusarium sp. was proved to be the incitant of a wilt disease of Cicer arietinum in California, characterized by yellowing of foliage and necrosis of xylem tissue. Verticillium albo-atrum was also pathogenic to C. arietinum.

70. GOULD, C. J. Turf diseases in western Washington in 1955-1956. Plant Dis. Reptr. 41: 344-347. 1957.

Both Fusarium nivale and Corticium fuciforme caused dead patches in golf course greens.

71. GRAHAM, J. H., V. G. SPRAGUE and R. R. ROBINSON. Damping-off of ladino clover and lespedeza as affected by soil moisture. Phytopathology 47: 182-185. 1957.

Rhizoctonia solani, Pythium debaryanum, and the Fusarium roseum group were found to respond differently to temperature and moisture in regard to their capacities for causing damping-off in ladino and lespedeza.

72. HAWN, E. J. Studies on crown bud rot of alfalfa in southern Alberta. Diss. Abstr. 17: 939-940. 1957.

Crown bud rot of lucerne is widespread in irrigated stands in Alberta. The main advance of the disease in each year occurs during the first month of active growth, being most pronounced in 2- and 3-year stands. Temperatures above 16°C arrest the development of the disease. The most pathogenic isolates to crown buds were Rhizoctonia solani, Fusarium avenaceum, F. acuminatum, and Ascochyta imperfecta, in descending order. Brassicol and 8-hydroxyquinoline sulfate gave partial control in the field for a short time.

73. HENDERSON, MOIRA E. K. Metabolism of methoxylated aromatic compounds by soil fungi. J. Gen. Microbiol. 16: 686-695. 1957. (Rev. Appl. Mycol. 36: 665. 1957.)

Species of Haplographium, Hormodendrum, and Penicillium utilized

both p-monomethoxybenzoic acids and p-monohydroxybenzoic acids before the m or o forms. Penicillium sp. formed p-methoxyphenol from p-methoxybenzoic acid. It is suggested that the ability of these soil fungi to demethylate compounds in which the methoxyl group is attached to the benzene ring may have some bearing on the transformation of lignified plant materials in the soil.

74. HUBERT, F. P. Diseases of some export crops in Indonesia. Plant Dis. Reptr. 41: 55-63. 1957.

Slow decline often affects clove trees in Central Sumatra and threatens the clove industry of central Java. Cultures of a Phytophthora sp. were obtained from the roots of infected trees. Foliage symptoms were often absent until the disease in the root system was well advanced. Root rots of rubber, tea, cacao, coffee, quinine, sugarcane, tobacco, and coconut are caused by Phytophthora, Corticium, Ganoderma, Fomes, Rosellinia, and Armillaria. "Blackleg and hollow stock", reportedly caused by Erwinia (Bacillus) aroideae (Towns.) Holland, is listed as a bacterial disease of Java tobacco.

75. KNORR, L. C., R. F. SUIT and E. P. DUCHARME. Handbook of citrus diseases of Florida. U. of Florida Agr. Exp. St. Bull. 587. 1957.

Damping-off is caused by any one of several species of fungi, including Phytophthora spp. In the case of foot rot caused by Phytophthora parasitica and P. citrophthora, which are found in the soil, lesions may occur below ground. A root rot with which Diplodia is associated causes the decline of trees in wet, heavy soil.

76. LEYENDECKER, PHILIP J. and ROY M. NAKAYAMA. 1956 Plant disease summary for New Mexico. Plant Dis. Reptr. 41: 53-54. 1957.

Phytophthora capsici Leonian, which is important primarily as a pathogen of the fruit of chile, also can girdle the main stem at the ground line, causing complete collapse and death of plants. Fusarium wilt (F. oxysporum f. batatas) of sweet potato was quite severe in a commercial planting of the Kendee variety. Wilt (Verticillium albo-atrum) caused a 7 percent reduction in yield of upland cotton and a 25 to 75 percent loss of okra. Seedling diseases (Rhizoctonia, etc.) on cotton accounted for a loss of 2 percent of the crop.

77. LITZENBERGER, S. C. and J. A. STEVENSON. A preliminary list of Nicaraguan plant diseases. Plant Dis. Reptr. Suppl. 243. 1957. (Rev. Appl. Mycol. 36: 683. 1957)

Fusarium vasinfectum and Verticillium albo-atrum are reported on cotton.

78. MOREAU, MIREILLE. Le dépérissement des oeillets. (Carnation wilt.) Encycl. mycol. 30, viii + 308 pp., Paris, Paul Lechevalier. 1957. (Rev. Appl. Mycol. 36: 762-763. 1957.)

Examination of affected carnations showed that nearly 100 species of fungi could be found therein, including saprophytes. Important parasites are Phialophora (Verticillium) cinerescens, Fusarium oxysporum, F. roseum, Alternaria dianthi, Phytophthora cactorum, Rhizoctonia (Corticium) solani, and R. bataticola (Macrophomina phaseoli).

79. SACKSTON, W. E. Diseases of sunflowers in Uruguay. Plant Dis. Reptr. 41: 885-889. 1957.

Black root rot caused by Sclerotium bataticola was found to affect a few plants in many fields. Fusarium oxysporum was isolated from the roots of many plants killed by root rot. In a few cases it was the only organism isolated; in many cases it was intimately associated with Sclerotium bataticola.

80. SPRAGUE, RODERICK. Fungi isolated from roots and crowns of pear trees. Plant Dis. Reptr. 41: 74-76. 1957.

Representatives of many genera are tabulated alphabetically.

81. STARR, G. H. et al. 1957 Potato handbook. Disease control issue. 79 pp. Potato Association of America, New Brunswick, New Jersey. 1957.
Contains sections on (a) ring rot (Corynebacterium sepedonicum) by G. H. Starr, (b) common scab (Streptomyces scabies) by W. J. Hooker, and (c) Verticillium wilt (V. albo-atrum) by J. G. McLean and R. V. Akeley.

82. TOLBA, M. K. and A. L. SALIM. Rhizoctonia damping-off of some vegetables in Iraq. Nature 179: 1358-1359. 1957.
Isolations from damped-off seedlings of cabbage, cauliflower, cucumber, vetch, and peas, yielded the pathogenic fungi Rhizoctonia solani, Pythium intermedium, and Fusarium sp.

83. WRIGHT, ERNEST. Influence of temperature and moisture on damping-off of American and Siberian elm, black locust, and desertwillow. Phytopathology 47: 658-662. 1957.
Black locust is highly susceptible to Pythium ultimum. Desert willow appears to be particularly susceptible to Rhizoctonia solani. No consistent relation was observed between the growth rates of damping-off parasites in vitro and apparent virulence at the same temperatures in damping-off tests.

84. ZOGG, H. Über die Beeinflusung von Pathogenität und Wachstum pflanzlicher Parasiten. I. Wirkung der Vorkultur auf verschiedene Fusskrankheitserreger bei Getreide. (On the factors affecting pathogenicity and growth of plant parasites. I. Effect of previous culture on various foot rot agents of cereals.) Phytopath. Z. 28: 423-426. 1957. (English summary) (Rev. Appl. Mycol. 36: 641. 1957.)
Cultures of various fungi causing foot rot of cereals in Switzerland were tested for their pathogenicity to wheat after 4 to 6 years' growth on various media. Culture on 2 percent malt agar followed by nutrient solution for a short period resulted in a marked decrease of the disease, but full virulence was restored in most cases by transference to straw.

Fungi -- Alternaria

85. LEVISOHN, IDA. Antagonistic efforts of Alternaria tenuis on certain root-fungi of forest trees. Nature 179: 1143-1144. 1957.
Two strains of Alternaria tenuis, isolated from forest nursery arable soils and found to be antagonistic to ectotrophic mycorrhiza of forest trees, were grown in mixed cultures on a synthetic medium with mycorrhizal fungi. Several were inhibited. It is suggested that the antagonism of A. tenuis to mycorrhiza-formers may be correlated with the poor growth of young trees not forming true mycorrhizal associations but having a profusion of pseudomycorrhizal infections.

Fungi -- Aphanomyces

86. SCHNEIDER, C. L. Studies on the pathogenicity and host range of the sugar beet black root fungus, Aphanomyces cochlioides Drechs. Diss. Abstr. 17: 735. 1957. (Rev. Appl. Mycol. 36: 804. 1957.)
In greenhouse inoculations of sugar beets at the University of Minnesota, zoospores were found to be the most suitable type of inoculum. Of the 94 plant species, representing 31 families, inoculated in the greenhouse and laboratory, 30 became infected. Greenhouse and field tests showed that none of the garden beet, mangel, or chard varieties was immune or more resistant than sugar beet varieties developed for blackroot resistance. Minor differences on the respective hosts were observed among some 40 single-spore isolates from Michigan, Minnesota, Montana, and Ohio which were studied in relation to physiological specialization.

87. SCHNEIDER, C. L. Viability of Rhizoctonia and Aphanomyces cultures kept under mineral oil and sealed with Parafilm. (Abstr.) Phytopathology 47: 453-454. 1957.
Eleven of 15 cultures of Aphanomyces cochlioides 7 to 7 1/2 years old were viable.

Fungi -- Centrospora

88. SRIVASTAVA, S. N. S. Centrospora acerina on carrot. Plant Path. 6: 113. 1957.
Licorice rot of carrots, caused by Centrospora acerina (Hartig) Newhall, developed on carrots left in a garden near Edinburgh, Scotland, over winter. This is the first record of the fungus in Scotland.

Fungi -- Ceratocystis

89. HILDEBRAND, E. M. Testing sweetpotatoes for black rot resistance. Plant Dis. Reptr. 41: 661-670. 1957.
The resistance of 300 sweet potato seedling selections and unknowns to three virulent cultures of the black rot fungus Ceratocystis fimbriata Ell. & Halst. was determined.

Fungi -- Colletotrichum

90. MacNEILL, BLAIR H. Colletotrichum atramentarium in field tomatoes. Plant Dis. Reptr. 41: 1032. 1957.
Recently, the presence of Colletotrichum atramentarium has been noted in tomatoes in the field in southern Ontario. The fungus was found to be able to make at least limited systemic invasion of its tomato host.

Fungi -- Fusarium

See also 495, 496, 497, 502, 503, 505, 507, 517

91. ARMSTRONG, G. M. and JOANNE K. ARMSTRONG. Celery yellows Fusarium causes wilt of peas. (Abstr.) Phytopathology 47: 2. 1957.
Cross inoculation of peas and celery with Fusarium apii and F. oxysporum f. pisi races 1 and 2 showed the last two to be pathogenic only to peas while F. apii infected both. F. apii lost pathogenicity on one variety of peas (Thomas Laxton) during one year but not on the susceptible Golden Self-Blanching variety of celery.

92. ATKINS, JOHN G. First report of the bakanae disease of rice for U.S.A. and preliminary studies on growth stimulation by cultural filtrates. Plant Dis. Reptr. 41: 860-862. 1957.
Diseased rice seedlings observed at the Rice Pasture Experiment Station, Beaumont, Texas, showed symptoms that were similar to those described for the bakanae disease in Japan. Fusarium sp. was isolated. Symptoms similar to those observed in the field were produced in controlled tests. Cultures of the fungus added to soil containing sprouted seeds produced up to 77 percent increase in the height of rice seedlings, the response presumably being due to gibberellic acid or a similar chemical.

93. BAKER, RALPH. The height of invasion of two pathogens in carnation stems. (Abstr.) Phytopathology 47: 516. 1957.
Results indicated that Fusarium roseum f. cerealis, in contrast to F. oxysporum f. dianthi, is not likely to be carried in carnation cuttings.

94. BUXTON, E. W. Some effects of pea exudates on physiologic races of Fusarium oxysporum. Brit. Mycol. Soc. Trans. 40: 145-154. 1957.
Exudates from pea cultivars, Onward, Alaska, and Delwich Commando, which differentiate between three physiologic races of Fusarium oxysporum, differently affected spore germination in the three races, depressing the germination of races to which they were resistant more than that of the ones

to which they were susceptible.

95. BUXTON, E. W. In Report of the Rothamsted Experimental Station for 1956, 280 pp. 1957. (Rev. Appl. Mycol. 36: 815. 1957.)

The results of comprehensive investigations in England on wilt of peas caused by Fusarium oxysporum f. pisi are summarized. The studies included investigations on resistance and susceptibility of varieties, effect of herbicides added to infested soils, the rhizosphere populations and root exudates from pea varieties with different susceptibilities to the three physiologic races of the pathogen, etc. The evidence obtained indicated that roots of pea varieties resistant to F. oxysporum f. pisi either secrete substances that prevent race 1 spores from germinating or stimulate the production of a soil microflora exerting this effect.

96. COLLINS, R. P. and R. P. SCHEFFER. Systemic factors in Fusarium wilt of tomato. (Abstr.) Phytopathology 47: 6. 1957.

As early as 2 days after inoculation with Fusarium oxysporum f. lycopersici, leaves from infected plants had higher respiration than did disease-free controls. Since leaves were not invaded by the fungus, the findings demonstrate systemic toxemia.

97. DIMOND, A. E. and MALCOLM E. CORDEN. Reduction and promotion of the development of Fusarium wilt of tomato by gibberellic acid. (Abstr.) Phytopathology 47: 519. 1957.

Gibberellic acid (GA) accelerated the growth of tomato plants for 2 weeks after application, but untreated plants eventually became as tall as treated ones. Treatments did not affect root development. After its growth effect had disappeared, GA continued to affect resistance of tomato plants to Fusarium wilt. GA had no effect on growth of Fusarium in culture in the range from 1 to 20 ppm.

99. HARE, W. W. Inheritance of resistance of Fusarium wilt in cowpeas. (Abstr.) Phytopathology 47: 312-313. 1957.

In breeding trials with cowpea for resistance to Fusarium oxysporum f. tracheiphilum (F. bulbigenum var. tracheiphilum), the results indicated that resistance to races 2 and 3 depends on two dominant genes.

100. HOOD, JOHN R. and ROBERT N. STEWART. Factors affecting symptom expression in Fusarium wilt of Dianthus. Phytopathology 47: 173-178. 1957.

Root-dip and stem-wound inoculation with Fusarium oxysporum f. dianthi induced symptoms of carnation Fusarium wilt more quickly than did inoculation by infestation of the soil. Approximately 1500 fungus bodies per ml of inoculum were needed to induce symptoms when inoculation was by the root-dipping method. Existence of three pathogenic races of the pathogen was established by tests on 11 commercial varieties of carnations.

101. MORGAN, O. D. Mimosa wilt spreading in southern Maryland. Plant Dis. Reptr. 41: 51-52. 1957.

Cultures of a fungus from vascular tissues of Albizzia julibrissin in three areas showed a Fusarium associated with the disease. Symptoms indicate that the disease is caused by F. oxysporum f. perniciosum Hepting.

102. NAIR, P. N. and T. KOMMEDAHL. The establishment and growth of Fusarium lini in flax tissues. (Abstr.) Phytopathology 47: 25. 1957.

Seedlings of Punjab flax were immersed in spore suspensions of Fusarium lini. Hyphae were found to have entered root hairs and were abundant in both xylem and phloem, but only phloem tissues were disintegrated.

103. OSTAZESKI, STANLEY A. and J. W. GERDEMANN. Effect of methods of soil infesta-

tion on the pathogenicity of three fungi associated with red clover root rot. (Abstr.) Phytopathology 47: 26. 1957.

The pathogenicity of Fusarium solani, F. oxysporum, and Gliocladium roseum on red clover seedlings was tested by comparing five methods of incorporating the test organisms with the soil.

104. PATEL, P. N. et al. Fusarium wilt of Cumin. Curr. Sci. 26: 181-182. 1957. (Rev. Appl. Mycol. 36: 727. 1957.)

Fusarium oxysporum f. cumini, n. f., causes serious losses on cumin in India.

105. RAABE, ROBERT D. Fusarium wilt of Hebe buxifolia. (Abstr.) Phytopathology 47: 532. 1957.

Fusarium oxysporum f. hebae n. f. causes a previously undescribed wilt of Hebe buxifolia in California.

106. RISHBETH, J. Fusarium wilt of bananas in Jamaica. II. Some aspects of host-parasite relationships. Ann. Bot. N.S. 21: 215-245. 1957.

The possible mode of action of various factors on wilt diseases is discussed, and the importance of vigorous root growth in promoting host resistance is emphasized.

107. STOVER, R. H. Ecology and pathogenicity studies with two widely distributed types of Fusarium oxysporum f. cubense. (Abstr.) Phytopathology 47: 535. 1957.

The banana wilt Fusarium occurs as two cultural and physiological types, designated yellow and non-yellow. Only the yellow type was highly virulent, causing 80 percent disease on tomato cuttings versus 10 percent for non-yellow cultures. Infection of field plants following artificial inoculation depended on high concentrations of spores in contact with roots.

108. VENKATA RAM, C. S. Fusarinic acid production by Fusarium orthoceras in vitro. Experienta 13: 284. 1957.

In a study at Madras, India, on 23 species of Fusarium, the secretion of fusarinic acid by F. orthoceras was demonstrated by biological methods and paper chromatography.

109. WILLET, J. R. and L. BÉRCZY. Penwortelziekte bij koffie. (Tap-root disease of coffee.) Bergcultures 26: 115, 117-119. 1957. (Rev. Appl. Mycol. 36: 644. 1957.)

Fomes lignosus and species of Rhizoctonia, Fusarium, and Diplodia contribute to the decline of coffee trees in East Java through secondary infection of the roots, after the trees have already been injured by adverse environmental conditions.

Fungi -- Fusarium -- Resistance

110. BAKER, RALPH. Comparative studies on the resistance of ten carnation varieties to Fusarium stem rot. (Abstr.) Phytopathology 47: 3. 1957.

Miller's Yellow and William Sim varieties of carnation were compared to determine their resistance to Fusarium roseum f. cerealis. When these varieties were inoculated immediately after "striking" or transplanting and later rated for disease severity, no consistent differences in susceptibility were noted. In further tests, rooted cuttings of the two varieties were inoculated at intervals from none to 24 days after transplanting. Miller's Yellow was still susceptible 24 days after transplanting, whereas William Sim was moderately resistant 4 days after transplanting.

111. CORDEN, M. E. and A. E. DIMOND. Relation of plant-growth regulating properties of naphthalene aliphatic acids to their activity in inducing disease resistance. Phytopathology 47: 518. 1957.

A series of naphthalene-substituted aliphatic acids having chain

lengths of 2 or 4 carbons varied in growth-regulating properties and in ability to induce resistance to Fusarium wilt of tomato. Root elongation is inhibited.

112. McCLELLAN, W. D. and R. L. PRYOR. Susceptibility of gladiolus varieties to Fusarium, Botrytis and Curvularia. Plant Dis. Reptr. 41: 47-50. 1957.
Resistance to disease caused by the above fungi is not controlled by the same genes.

113. SCHEFFER, R. P. Analysis of Fusarium resistance in tomato by grafting experiments. Phytopathology 47: 328-331. 1957.
Tomato plants were approach grafted in pairs, and tops were inoculated through scion spurs with bud cell suspensions of Fusarium oxysporum f. lycopersici. Resistance or susceptibility of scions was not changed by the resistance or susceptibility level of stocks.

114. SCHEFFER, R. P. Grafting experiments with Fusarium wilt resistant and susceptible tomato plants. (Abstr.) Phytopathology 47: 30. 1957.
Susceptible and highly resistant tomato plants were approach grafted in pairs. When graft unions were firm, the top of one plant and the bottom of the other in each pair were severed, and bud cell suspensions of Fusarium oxysporum f. lycopersici were introduced through spurs of scions. Combinations used were susceptible scion on resistant stock, susceptible scion on susceptible stock, etc. The data obtained are evidence against the theory that susceptibility depends on root-produced factors.

115. THEIS, THOMAS, and F. A. JIMINEZ. A vanilla hybrid resistant to Fusarium root rot. Phytopathology 47: 579-581. 1957.
Attempts to develop high quality disease-resistant (to Fusarium batatatis var. vanillae) plants have been made by crossing Vanilla planifolia and V. phaeantha (resistant). Further backcrossing to V. planifolia is necessary.

116. WAGGONER, PAUL E. and A. E. DIMOND. Altering disease resistance with ionizing radiation and growth substances. Phytopathology 47: 125-130. 1957.
In comparative studies of the effects of X-radiation and growth substances upon resistance to Fusarium wilt of tomato, shoot irradiation decreased resistance of highly susceptible, multiple-gene-resistant, and single-gene-resistant, tomatoes.

117. WALKER, J. C., R. H. LARSON and G. S. POUND. Badger ballhead, a new cabbage resistant to yellows and mosaic. Phytopathology 47: 269-271. 1957.
Badger ballhead is a new cabbage variety, homozygous for monogenic resistance to yellows incited by Fusarium oxysporum f. conglutinans (Wr.) Snyd. & Hans. The variety is also moderately resistant to mosaic, incited by the combined activity of turnip virus 1 and cauliflower virus 1.

Fungi -- Helminthosporium

118. CHINN, S. H. F. and R. J. LEDINGHAM. Studies on the influence of various substances on the germination of Helminthosporium sativum spores in soil. Can. J. Bot. 35: 697-701. 1957.
106 substances were studied for their effect on the germination of conidia of Helminthosporium sativum in soil. Spores usually germinated when substances from groups composed of natural products were included in the substrate. When wheat straw and roots of wheat plants were added to the soil the conidia did not germinate.

119. CLARK, R. V. and J. G. DICKSON. The relation of temperature to disease development by Helminthosporium sativum on barley. (Abstr.) Phytopathology 47: 6. 1957.
Seedling blight and root rot developed severely at temperatures ranging

from 8° to 28° C. Maximum development usually occurred at 20°. Considerable shifting in the reaction of the isolates and in the response of the varieties occurred within the replicates of an experiment and between experiments in the development of the seedling blight and root rot.

120. HRUSHOVETZ, S. B. Effect of amino acids on the virulence of Helminthosporium sativum to wheat seedlings. Phytopathology 47: 261-264. 1957.

Progressive attenuation of the virulence of Helminthosporium sativum through six successive transfers was affected by adding 0.1 percent of any one of the amino acids, alanine, arquinine, histidine, isoleucine, leucine, methionine, serine, threonine, and tryptophane, to Czapek's agar medium upon which the pathogen had been cultured before it was used in making soil inoculum.

121. SKOROPAD, W. P. and D. C. ARNY. The influence of amino acids on the growth of two strains of Helminthosporium gramineum. Phytopathology 47: 249-252. 1957.

Two strains of Helminthosporium gramineum that showed marked differences in pathogenicity on certain barley varieties were grown on liquid media containing various amino acids and amides (known to be present in barley seedlings), either singly or in combinations. Responses to combinations of several amino acids indicated that certain ones, even though present in relatively small amounts, could exert considerable influence on the growth of the fungus strains. The amino acid nutrition of the fungus appears to be of potential importance in relation to its pathogenicity.

Fungi -- Idriella

122. NELSON, PAUL E. Pathogenicity of Idriella lunata on strawberry. Phytopathology 47: 438-443. 1957.

Idriella lunata was isolated from the roots of strawberry plants in areas where root degeneration was extensive.

Fungi -- Olpidium

123. OSTERWALDER, A. Olpidium in Wurzeln von Erica gracilis Salisb. (Olpidium in roots of Erica gracilis Salisb.). Z. PflKrankh. 64: 328-331. 1957.

The species of Olpidium recently reported as causing damage to the roots and sometimes death of Erica gracilis plants in Switzerland has been identified as O. brassicae. The root rot is controlled by the use of steam-sterilized soil, pots, and implements.

Fungi -- Ophiobolus

124. TURNER, E. M. The effect of some amino acids on the growth of two varieties of Ophiobolus graminis. J. Gen. Microbiol. 16: 531-533. 1957.

In the study of the amino acid requirements of Ophiobolus graminis, the type variety and variety avenae, growth with aspartic acid was equal to or almost as good as growth with hydrolysed casein. Growth was strongly inhibited by lysine and threonine. O. graminis var. avenae was inhibited by cystine and cysteine, but the type variety of O. graminis made good growth with both, indicating a difference in their metabolism and possibly correlated with their differing pathogenicity.

Fungi -- Phytophthora

See also 209, 291

125. APPLE, J. L. Pathogenic, cultural, and physiological variation within Phytophthora parasitica var. nicotianae. Phytopathology 47: 733-740. 1957.

More than 200 isolates were collected from 55 North Carolina counties,

from nine other States, and from four foreign countries. Most of these isolates were compared in inoculation tests and in culture.

126. BORDA, SEGUNDO ALANDIA and FRANK H. BELL. Diseases of warm climate crops in Bolivia. F.A.O. Pl. Prot. Bull. 5: 172-173. 1957.
The most destructive disease of citrus in the country as a whole is gummosis (Phytophthora sp.). P. cinnamomi has recently been isolated from the roots of dying avocado trees and it is therefore assumed that this fungus is the usual cause of avocado wilt in Bolivia.

127. ERWIN, DONALD C. and BILL W. KENNEDY. Studies on Phytophthora root rot of alfalfa. (Abstr.) Phytopathology 47: 520. 1957.
Phytophthora cryptogea causes a very serious disease of alfalfa in California. In the greenhouse the fungus induced the highest amount of root rot of seedlings at controlled soil temperatures of 22° and 27° C, very little occurred at 17°, and none at 32°. Zoospores appeared to be superior to mycelium or any other type of inoculum in tests of the resistance of alfalfa varieties.

128. FERNANDEZ, ROSENADA M. Enfermedad prieta del tabaco en Cuba. (Tobacco disease prieta in Cuba.) Agrotecnia 12: 32-36. 1957. (Tobacco Abstr. 1: 493. 1957.)
Prieta (Phytophthora parasitica var. nicotianae) is reported from Candelaria, Pinar del Rio. Symptoms and control are discussed.

129. GREGG, MARY. Germination of oospores of Phytophthora erythroseptica. Nature 180: 150. 1957.
Germination of comparatively young spores of Phytophthora erythroseptica has been obtained following passage through the digestive tract of the garden snail, Helix aspersa.

130. HERR, LEONARD J. Factors affecting a root rot of soybeans incited by Phytophthora cactorum. (Abstr.) Phytopathology 47: 15-16. 1957.
Young plants were more susceptible than older plants. Pathogen-free filtrates of culture solutions were not toxic to soybeans.

131. HERR, L. J. Nutritional studies of an isolate of Phytophthora cactorum inciting a root rot of soybeans in Ohio. (Abstr.) Phytopathology 47: 16. 1957.
Thiamin is required for growth. The nitrogen requirements of the fungus differed depending on whether sucrose or cellulose was used as the carbon source.

132. HOLLIDAY, P. and W. P. MOWAT. A root disease of Piper nigrum L. in Sarawak caused by a species of Phytophthora. Nature 179: 543-544. 1957.
The fungus was isolated from the cortical region of main roots and stems of dying plants. The term foot rot is proposed for the disease.

133. JARVIS, W. R. Host parasite relations. 4th Ann. Rept. Scottish Horticultural Inst., p. 33, 1956-57. 1957.
As part of the study of host-parasite relations in the strawberry red-core disease, the nutrition of physiological races of Phytophthora fragariae was examined. Growth in culture of these races was indistinguishable except when certain phenolic compounds, including analogues of strawberry root constituents, were added to the media. In particular, the races differed in ability to use caffeic acid, d-catechin and pyrocatechol. Differences in growth rate of races in the various media could not be correlated with the rate of utilization of phenols or the rate of appearance of phenolic oxidation and auto-oxidation products in the media.

134. KAUFMANN, M. J. and J. W. GERDEMANN. Root and stem rot of soybeans caused by a species of Phytophthora. (Abstr.) Phytopathology 47: 9. 1957.
The disease occurs on soybean plants of all ages. The fungus appears

to be closely related to Phytophthora megasperma. Reactions of soybean varieties may be determined rapidly by stem inoculation. Resistance is controlled by a single dominant gene.

135. KERR, A. Red core disease of strawberries. J. Dept. Agr. S. Aust. 60: 354-356. 1957.

First report of the disease (Phytophthora fragariae) in Australia.

136. NEWTON, W. The growth of Phytophthora species as influenced by para-aminobenzoic acid. (Abstr.) Phytopathology 47: 530. 1937.

The growth of Phytophthora parasitica (from tomato) and of P. parasitica var. nicotianae (from tobacco) was markedly inhibited by p-aminobenzoic acid at concentrations as low as 20 ppm in oatmeal-dextrose broth shake cultures. The growth of P. cactorum (from apple) was also strongly inhibited by 80 ppm but not by lower concentrations. In contrast, 100 ppm had little effect upon the growth of P. infestans (from potato).

137. OXENHAM, B. L. Diseases of pineapple. Qd. Agric. J. 83: 13-26. 1957. (Rev. Appl. Mycol. 36: 478-479. 1957.)

Top or heart rot, caused by Phytophthora cinnamomi and less commonly by P. parasitica, is stated to be serious on flat or poorly drained land. Crop rotation is advisable.

138. POWELL, N. T. and C. J. NUSBAUM. Pathogen-suscept relations of Phytophthora parasitica var. nicotianae in roots of certain tobacco varieties and Nicotiana spp. (Abstr.) Phytopathology 47: 27-28. 1957.

Cytological studies were made of infections by the black shank fungus in roots of suscepts representing a wide range of resistance levels. All strains of the pathogen readily entered the roots of each suscept, but there were marked differences in the extent of cortical penetration by different strains on any one host.

139. ROTH, LEWIS, EDWARD J. TRIONE and WILLIAM H. RUHMAN. Phytophthora-induced root rot of native Port-Orford-cedar. J. Forest. 55: 294-298. 1957.

In 1952, Phytophthora lateralis, which had damaged Port Orford cedar (Chamaecyparis lawsoniana) planted outside its native habitat for more than a decade, was discovered in Coos Bay, Oregon, near the heart of the native cedar range. Infection spread rapidly, reaching the north and south limits of the commercial cedar range within 2 years.

140. SCHMIDLE, A. Über Infektionsversuche an Apfelbäumen mit Phytophthora cactorum (Leb. et Cohn) Schroet., dem Erreger der Kragenfäule. (On inoculation experiments on apple trees with Phytophthora cactorum (Leb. & Cohn) Schroet., the agent of collar rot.) Phytopath. Z. 28: 329-342. 1957. (Rev. Appl. Mycol. 36: 473-474. 1957.)

Report from the Horticultural Institute, Heidelberg, Germany, on the results of inoculation experiments with Phytophthora cactorum on apple trees, using four strains from collar rot lesions on the same host, one from a branch necrosis of apricot, and two from decayed strawberry fruits. The pathogenicity of the apricot isolate was fully equal to that of the apple strains, one of those from strawberry was of comparable virulence, while the effects of the other were much milder.

141. TRIONE, E. J. and L. F. ROTH. Aerial infection of Chamaecyparis by Phytophthora lateralis. Plant Dis. Reptr. 41: 211-215. 1957.

Root rot of Chamaecyparis lawsoniana caused by Phytophthora lateralis has increased greatly along the southwest coast of Oregon and is now epiphytotic. In the summer of 1954, aerial infections caused by the fungus were found on the foliage. The known hosts of P. lateralis are in the genus Chamaecyparis (Port Orford cedar).

142. VAARTAJA, O. The susceptibility of seedlings of various tree species to Phytophthora cactorum. Bi-m. Prog. Rept. Div. For. Biol., Dept. Agr. Can. 13 (2): 2. 1957. (Rev. Appl. Mycol. 36: 795. 1957.)

Phytophthora cactorum was shown to be potentially pathogenic to four species each of pine and spruce, two of larch, one of birch, and to elm.

143. ZECK, W. Untersuchungen über Infektionsverhältnisse bei der Phytophthora-Knollenfäule und über deren Beeinflussbarkeit durch Kupferdüngung. (Studies on infection relations in the Phytophthora tuber rot and on its amenability to influence by copper fertilizing.) Phytopath. Z. 29: 233-265. 1957.

From studies in Germany it was concluded that infection is caused by spores which are formed on the leaves and washed down into the soil on to the tubers. The nature and intensity of infection depend on the state of maturity of the tubers, young ones being more readily attacked at the "eyes", lenticels, and probably through the still labile cork layer. Neither in pot nor in field experiments did soil amendments with up to 500 or 800 kg copper sulphate per ha. effect a significant reduction of tuber infection.

Fungi -- Phytophthora -- Resistance

144. BERNARD, R. L. et al. Inheritance of resistance to Phytophthora root and stem rot in the soybean. Agron. J. 49: 391. 1957.

Resistance is controlled by a single dominant gene.

145. HEGGESTAD, H. E. and W. B. LAUTZ. Some results of studies on resistance to tobacco black shank. (Abstr.) Phytopathology 47: 452. 1957.

Variation in pathogenicity was observed between isolates of the fungus (Phytophthora parasitica var. nicotianae).

146. JOHNSON, HERBERT W. Soybean breeding research. Soybean Digest 17 (11): 60, 62. 1957.

The inheritance of resistance to Phytophthora root rot has been determined and a crossing program designed to transfer the resistance to varieties best adapted to the area and to develop new varieties is well along.

147. LAUTZ, W. Resistance to black shank of 51 species of Nicotiana and of 13 interspecific hybrids. Plant Dis. Reptr. 41: 95-98. 1957.

None proved immune, some were highly, others moderately resistant, etc.

148. REID, R. D. New strawberry variety "Redgauntlet". 4th Ann. Rept. Scottish Hort. Res. Inst., pp. 41-42, 1956-57. 1957.

Redgauntlet is resistant to some of the ordinary races of Phytophthora fragariae, but is less resistant than Talisman to some of the specialized races which attack existing resistant varieties such as Climax.

149. REID, R. D. Strawberry breeding. 4th Ann. Rept. Scottish Hort. Res. Inst., p. 34, 1956-57. 1957.

Intensive testing and selection of seedlings for resistance to red core (Phytophthora fragariae) has been continued and a large number of additional crosses made. Seedlings that survive the initial laboratory and field tests and show promise of horticultural merit are selected for fruiting trials. Field tests show that many seedlings which escape infection in the greenhouse become infected in the field.

Fungi -- Pythium

150. ERWIN, D. C. and JAMES W. CAMERON. Susceptibility of five sweet corn varieties to Pythium graminicola. Plant Dis. Reptr. 41: 988-990. 1957.

Pythium graminicola Subr., obtained from diseased roots of Wisconsin 23 sweet corn grown in southern California, incited a root rot on five varieties of sweet corn in greenhouse experiments. In the field root rot from natural infection occurred primarily on the early maturing varieties

when grown in late summer.

151. HAMPTON, RICHARD O. Host specificity in Pythium graminicolum. (Abstr.) Phytopathology 47: 14. 1957.

Isolates of Pythium graminicolum Subr. obtained from corn, wheat, barley, rye, and Setaria, were tested on a variety of hosts. There were tendencies toward host preferences among the isolates.

152. HINE, RICHARD B. Growth repression of pear trees planted following plum. (Abstr.) Phytopathology 47: 524. 1957.

Root development of seedlings in soil from affected orchard was poor and there were numerous lesions on the feeder roots. Pythium isolates that proved to be pathogenic to pear roots were consistently recovered from the lesioned areas.

153. NEWHOOK, F. J. A Pythium disease of pear trees. N. Z. J. Sci. Tech. Sect. A. 38: 533-538. 1957.

The fungus attacks phloem of trunks, of leaders, and occasionally of branches.

Fungi -- Rhizoctonia

154. ERWIN, D. C. and BILL W. KENNEDY. The relationship of Rhizoctonia solani to a root disease of flax. (Abstr.) Phytopathology 47: 520. 1957.

Rhizoctonia solani was isolated from affected areas of the tap and lateral roots of flax. The evidence indicates that Rhizoctonia may damage flax roots under certain conditions in the field.

155. McWHORTER, FRANK P. Association between Rhizoctonia and yellow coloration of Easter lily bulbs. Phytopathology 47: 447-448. 1957.

Treatment with PCNB of stem bulblets of Easter lily planted in soil known to contain Rhizoctonia solani resulted in the production of yearling bulbs free from the yellow pigmentation normally found in their scales. On the yellowed scales of other bulbs examined the extent of yellowing was found to be correlated with the degree to which R. solani was present.

156. REYNOLDS, HAROLD W. and R. G. HANSON. Rhizoctonia disease of cotton in presence or absence of the cotton root-knot nematode in Arizona. Phytopathology 47: 256-261. 1957.

The presence of the cotton root-knot nematode, Meloidogyne incognita acrita, affects the incidence of post-emergence damping-off caused primarily by Rhizoctonia solani. A direct correlation exists between the two.

157. THEIS, T., R. H. FREYRE and W. C. KENNARD. Pellicularia filamentosa on Tephrosia vogelii and Cajanus indicus in Puerto Rico. F.A.O. Pl. Prot. Bull. 5: 159-160. 1957.

During 1956 plots of Tephrosia vogelii at Mayaguez, Puerto Rico, were attacked by Pellicularia filamentosa, which caused defoliation and death of the young parts of the stems. Adjoining plots of pigeon peas were attacked by the same fungus. Control was obtained by spraying twice weekly with Bordeaux mixture and zinc bisdithiocarbamate (zineb) alternately until the advent of dry weather.

Fungi -- Sclerotium

158. LAVEE, B. A physiological effect of triethanolamine on the development of Sclerotium rolfsii Sacc. Nature 180: 1494. 1957.

The effect of triethanolamine on Sclerotium rolfsii in culture was indicated to be a fungistatic one. When sclerotia that failed to germinate after 8 1/2 days on media containing high concentrations of triethanolamine

(3840 ppm) were transferred to control media they developed into normal cultures but with a slightly lower production of new sclerotia in comparison with the control cultures. It is concluded that triethanolamine is not an inert solvent as commonly assumed.

159. LEWIS, G. D. White rot of onion in New York. Plant Dis. Reptr. 41: 814. 1957.
White rot of onion caused by Sclerotium cepivorum Berk. was found in two muckland onion fields near Florida, New York, in June 1957. Approximately 30 percent of the plants in the affected area were destroyed.

160. SNYDER, W. C. and H. N. HANSEN. A Sclerotinia sp. (Imp. Sclerotium) with limited antifungal activity. (Abstr.) Phytopathology 47: 33. 1957.
This Sclerotium sp., isolated from dead or dying underground stems and roots of cereals, does seem to have interesting biologic properties in that it shows competitive or antagonistic action towards certain plant pathogens and rapidly invades sterilized soil.

Fungi -- Verticillium

161. CHILTON, JOHN E. Sesame (Sesamum indicum L.), a host for Verticillium albo-atrum Reinke & Berth. Plant Dis. Reptr. 41: 803. 1957.
This is apparently the first published record of Verticillium wilt of sesame in the United States (New Mexico).

162. EDGINGTON, L. V. and J. C. WALKER. Influence of soil and air temperature on Verticillium wilt of tomato. Phytopathology 47: 594-598. 1957.
The optimum temperatures for growth in culture of three "dauermycelial" and of three pseudosclerotial isolates of Verticillium albo-atrum were 22° and 24° C, respectively. All three "dauermycelial" isolates incited marked symptoms on tomato plants at soil temperatures of 20° or 24° combined with air temperatures of 16°, 20°, or 24°; symptoms were less severe at these soil temperatures when the air temperature was 28° than when it was lower.

163. ENGELHARD, ARTHUR W. Host index of Verticillium albo-atrum Reinke & Berth. (including Verticillium dahliae Kleb.). Plant Dis. Reptr. Suppl. 244. 1957.

164. GREEN, RALPH J. The vertical distribution of Verticillium albo-atrum in muck soils and its control. (Abstr.) Phytopathology 47: 522. 1957.
Studies of the vertical distribution of Verticillium albo-atrum in muck soils revealed a pattern completely different from that found in mineral soils.

165. HOLMES, F. W. Verticillium wilt of dogwood. (Abstr.) Phytopathology 47: 17. 1957.
Verticillium albo-atrum obtained from a dying dogwood tree (Cornus florida L.) proved to be pathogenic to elm, maple, and dogwood. This is the first report of this fungus as causing a disease of dogwood.

166. ISAAC, IVOR. The effects of nitrogen supply upon the Verticillium wilt of Antirrhinum. Ann. Appl. Biol. 45: 512-515. 1957.
The ability of isolates of Verticillium albo-atrum, V. dahliae, V. nigrescens, V. nubilum, and V. tricorpus to penetrate the Antirrhinum plant, even when wounded, was reduced if the medium or soil were deficient in nitrogen.

167. ISAAC, IVOR. Verticillium wilt of Brussels sprout. Ann. Appl. Biol. 45: 276-283. 1957.
A wilt disease of Brussels sprouts caused by Verticillium dahliae Kleb. is described. Field observations, corroborated by experiment, indicate that the disease is more severe in a wet than in a dry season. Evidence indicates that the V. dahliae from Brussels sprouts is a distinct physiological strain.

168. ISAAC, IVOR. Wilt of lucerne caused by species of Verticillium. Ann. Appl. Biol. 45: 550-558. 1957.

A wilt disease of lucerne caused by species of Verticillium is described; in 28 areas in England and Wales the pathogen was V. albo-atrum; in one area it was V. dahliae. Manurial trials showed that the incidence of wilt induced by V. albo-atrum was very severe under all soil conditions tested, whereas V. dahliae is a virulent pathogen only to plants in soil rich in superphosphate.

169. Le TOURNEAU, DUANE. The production of oligosaccharides by Verticillium albo-atrum. (Abstr.) Phytopathology 47: 527. 1957.

Analyses for sucrose, glucose, fructose and unknowns were made by paper chromatography.

170. Le TOURNEAU, DUANE, J. G. McLEAN and J. W. GUTHRIE. Effects of some phenols and quinones on growth in vitro of Verticillium albo-atrum. Phytopathology 47: 602-606. 1957.

In tests involving liquid cultures of Verticillium albo-atrum the quinones were generally more inhibitory than were the phenols. Chlorination of the quinones increased their effectiveness as inhibitors.

171. PEGG, GEORGE F. A hyaline variant of Verticillium albo-atrum pathogenic to tomato plants. Phytopathology 47: 57-58. 1957.

A hyaline variant of Verticillium albo-atrum pathogenic to tomato plants is described. On 5 percent maize meal agar this fungus formed aerial ropes of hyphae bearing simple or verticilliate conidiophores. There is a marked similarity between this strain and V. intertextum Isaac & Davies.

172. ROGERSON, CLARK T. Verticillium wilt in Kansas. Plant Dis. Reptr. 41: 1053-1054. 1957.

The host range of Verticillium wilt is extended to include western catalpa, Moline elm, redbud, Russian olive, and turnip.

173. ROSS, J. P. Free amino acids and amides in healthy and Verticillium-infected peppermint and chrysanthemum plants. (Abstr.) Phytopathology 47: 29. 1957.

Paper-partition chromatography was used to determine the free amino acids in leaf and stem extracts of plants infected with Verticillium albo-atrum and of healthy checks.

174. SACKSTON, W. E., W. C. McDONALD and JOHN MARTENS. Leaf mottle or Verticillium wilt of sunflower. Plant Dis. Reptr. 41: 337-343. 1957.

The disease was first recognized in Manitoba in 1948. The causal organism, Verticillium albo-atrum, is soil borne and apparently can survive and attack sunflowers even after successive grain crops.

175. TOLMSOFF, W. J. and R. A. YOUNG. Relation of inoculum potential of Verticillium albo-atrum to development and severity of wilt in potatoes. (Abstr.) Phytopathology 47: 536. 1957.

Although the use of Vapam (sodium N-methyldithiocarbamate dihydrate) resulted in control of the disease, incidence of infection was not affected. Severity of symptoms, time of plant death, and tuber yield were related to amount of inoculum.

176. WELTZIEN, H. C. Untersuchungen über das Vorkommen der Luzernevertizilliose und weiterer Luzerneerkrankungen in Südwestdeutschland. (Studies on the occurrence of verticilliosis and other diseases of lucerne in south-west Germany.) NachrBl. dtsch. PflSchDienst (Braunschweig), Stuttgart, 9: 42-45. 1957. (Rev. Appl. Mycol. 36: 530-531. 1957.)

Verticillium infection has been at least an essential factor in the markedly diseased condition of lucerne in several districts in southwest Germany, over the period 1954 to 1956, which has caused almost total

loss of the seed crop. The progressive build up of infection there has now made it uneconomic to maintain a lucerne crop for more than 3 years.

177. WILHELM, STEPHEN. Determining the inoculum potential of Verticillium in soil and predicting subsequent wilt losses in strawberry. (Abstr.) Phytopathology 47: 37. 1957.

Because wilt losses in strawberry due to Verticillium reflect largely the previous susceptible crop or weed history of the land, a method of foretelling possible losses prior to planting of strawberries would be of great practical value. The previously described technique of estimating inoculum potential by determining an arbitrary infection index of soil samples proved useful.

INOCULUM POTENTIAL

See 175, 177

INSECTICIDES AND HERBICIDES

See also 471

178. RICHARDSON, LLOYD T. Effect of insecticides and herbicides applied to soil on the development of plant diseases. I. The seedling disease of barley caused by Helminthosporium sativum P. K. & B. Can. J. Pl. Sci. 37: 196-204. 1957.

It was found possible to separate nine insecticides and ten herbicides into four groups on the basis of their effects on the growth of barley seedlings and on the development of root rot infection. Their effects ranged from none at all to either increased or decreased severity of infection.

METHODS AND TECHNIQUES

179. CARTER, H. P. and J. L. LOCKWOOD. Methods for estimating numbers of soil microorganisms lytic to fungi. Phytopathology 47: 151-154. 1957.

When an agar medium containing a 2- to 4-day-old fungus culture prepared by seeding the agar with conidia was sprayed with a soil suspension, colonies of soil microorganisms surrounded by lytic zones appeared on the agar in from 2 to 3 weeks. These organisms were predominantly members of the genus Streptomyces.

180. CORMACK, M. W., R. W. PEAKE and R. K. DOWNEY. Studies on methods and materials for testing alfalfa for resistance to bacterial wilt. Can. J. Pl. Sci. 37: 1-11. 1957.

Several methods for inoculation of alfalfa with the bacterial wilt organism in the greenhouse and field are described. Also some factors affecting host-parasite relations are mentioned.

181. DOWSON, W. J. Isolation of soft rot bacteria on Weiringa's pectate gel. Nature 179: 682. 1957. (Rev. Appl. Mycol. 36: 458. 1957.)

The preparation of a pectate gel medium for the detection of the potato black leg organism (Pectobacterium carotovorum) (Erwinia carotovora) is described.

182. FAHRAEUS, GUSTA. The infection of clover root hairs by nodule bacteria studied by a simple glass slide technique. J. Gen. Microbiol. 16: 374-381. 1957.

A simple glass slide technique for continuous microscopical observation of growth and infection of root hairs of clover seedlings is described. The earliest infection of the root hairs of white clover inoculated with nodule bacteria was observed to take place within 48 hours of inoculation on 4-day-old seedlings.

183. FENWICK, D. W. Some experiments on the vacuum distillation of potato root diffusate. Nematologica 2: 277-284. 1957.

It is concluded that vacuum distillation of potato root diffusate is a practical method of decreasing its volume for storage. With a decrease

in volume to 10 percent the loss of active principle was only about 10 percent.

184. JOHNSON, H. G. A method for determining the degree of infestation by pea root-rot organisms in soil. (Abstr.) Phytopathology 47: 18. 1957.

Root rot indexes for field soils were established by testing them in the laboratory. The index is useful as an estimate of the hazard of planting peas in the field.

185. JOHNSON, L. F. Effect of antibiotics on the numbers of bacteria and fungi isolated from soil by the dilution-plate method. Phytopathology 47: 630-631. 1957.

Streptomycin and eight other antibiotics were added singly to Martin's peptone-dextrose agar containing rose bengal. Streptomycin at 30 μg/ml inhibited bacterial colonies effectively. Others most effective in inhibiting soil bacteria at low concentrations were the polycyclines.

186. MUELLER, K. E. and L. W. DURRELL. Sampling tubes for soil fungi. Phytopathology 47: 243. 1957.

Centrifuge tubes, after being bored, were wrapped spirally with Koroseal electrical tape, nearly filled with nutrient agar, plugged with cotton, and autoclaved. In the field, a flamed needle was pushed through the tape and perforations to allow entrance of fungal hyphae. After being embedded in the soil for 4 to 6 days, the tubes were collected and taken to the laboratory for isolation purposes.

187. NOVÁKAVÁ, JARMILA. A new method of isolation of blackleg-pathogens from diseased plants. Phytopath. Z. 29: 72-74. 1957. (Rev. Appl. Mycol. 36: 662-663. 1957.)

An adaptation of Stapp's method of serum preparation is described, which was used in a serological drop technique for the differentiation of the potato black-leg pathogen, Erwinia atroseptica, from saprophytic bacilli, e.g., Escherichia, Bacillus mycoides, and B. subtilis.

188. REILING, T. P. and T. H. KING. Correlation between pea root rot in commercial fields with greenhouse determinations of soil infestation. (Abstr.) Phytopathology 47: 28. 1957.

Greenhouse determination for root rot of peas showed a high correlation with root rot incidences in field crops grown later. Yield is inversely related to the amount of root rot.

189. RICHARDSON, LLOYD T. Quantitative determination of viability of potato ring rot bacteria following storage, heat, and gas treatments. Can. J. Bot. 35: 647-656. 1957.

A method for determining quantitatively the viability of Corynebacterium sepedonicum was developed for use in eradication studies on bacterial ring rot of potatoes.

190. SCHMITTHENNER, A. F. and L. E. WILLIAMS. Injection-infestation technique for studying root rot pathogens. (Abstr.) Phytopathology 47: 30. 1957.

A method involving injections with a hypodermic syringe and transplanting to sand-inoculum mixtures was found satisfactory for rapidly screening the root-rotting potential of a large number of fungus isolates including representatives of the following genera: Fusarium, Pythium, Rhizoctonia, and Phytophthora.

191. TYNER, L. E. Effect of moisture in partial-sterilization procedures. (Abstr.) Phytopathology 47: 536. 1957.

Propyline oxide was added at different rates to samples of barley seed containing varying amounts of water. Bacteria were not eliminated by any treatment and fungi were destroyed only in the seed to which water had been added. Reduction in the number of colonies of fungi varied directly with the amount of water added to the seed and with the temperature applied.

192. ZOGG, H. Studien über die biologische Bodenentseuchung. I. Einfluss der Bodenmi-

kroflora auf Ophiobolus graminis Sacc. (Methodik). (Studies on the biological disinfection of the soil. I. Influence of the whole soil microflora upon Ophiobolus graminis Sacc. (Method).) Phytopath. Z. 30: 315-326. 1957.

A method is described that allows an estimation of the biological activity of a soil microflora in relation to elimination of root rot parasites, especially of Ophiobolus graminis on wheat after some weeks or months.

MYXOMYCETES

193. AYERS, G. W. Races of Plasmodiophora brassicae. Can. J. Bot. 35: 923-932. 1957.

Six races of Plasmodiophora brassicae have been distinguished on the basis of pathogenicity to different hosts of cultivated and wilt crucifers.

194. COLHOUN, JOHN. A technique for examining soil for the presence of Plasmodiophora brassicae Woron. Ann. Appl. Biol. 45: 559-565. 1957.

The technique is described.

NEMATOCIDES

195. BRADBURY, F. R. et al. The nematicidal properties of azides. Ann. Appl. Biol. 45: 241-250. 1957.

The use of sodium azide and organic acid azides for the control of potato root eelworm has been investigated; in suitable conditions they were effective both in greenhouse tests and field trials. The biological activity of azides has been shown to arise from liberation of undissociated hydrozoic acid. The acid is liberated in effective quantities only in acid soils, but in such soils it is decomposed with formation of nitrogen.

196. BROTHERS, SHELBY L. and J. R. CHRISTIE. Some greenhouse tests with the nematicides PRD and ORD. Plant Dis. Reptr. 41: 772-777. 1957.

Two prospective nematocides were tested. These were PRD (3,4-dichlorotetrahydrothiophene 1,1-dioxide) and ORD (an isomer of PRD). The nematocidal efficacy of PRD compared favorably with that of Nemagon (1,2-dibromochloropropane), was somewhat better than that of ORD and considerably better than that of V-C 13 (O-2,4-dichlorophenyl-O,O-diethyl phosphorothioate). Both chemicals were phytotoxic, PRD somewhat more so than ORD.

197. FENWICK, D. W. Preliminary studies on the effect of ethylene dibromide fumigation on the hatchability of Heterodera rostochiensis (Woll.). Nematologica 2: 242-249. 1957.

The data suggest that fumigation of cysts with ethylene dibromide, in addition to reducing their hatchability, also affects the form of the hatching curve by increasing the time necessary to attain the point of inflection. In all cases, the greatest effect was obtained by fumigation at 30° C rather than at lower temperatures. The greater decrease in hatchability when cysts are tested some months after treatment suggests that the action of the chemical persists long after treatment.

198. HARRISON, MARTIN B. Fumigation of encysted golden nematode eggs and larvae under controlled environmental conditions. Phytopathology 47: 610-613. 1957.

Relation of relative humidity and temperature to effectiveness of various fumigants.

199. HARRISON, MARTIN B. A new approach to the evaluation of nematocides for the control of the golden nematode. (Abstr.) Phytopathology 47: 523. 1957.

In the testing of compounds as nematocides against Heterodera rostochiensis, the technique has been modified so that data on phytotoxicity may be taken simultaneously with counts of female nematodes. The efficacy of the compound is established by a count of the immature females that develop on the roots at the periphery of the soil ball.

200. HOLLIS, J. P. A statistical study of nematode populations in soil fumigation experi-

ments. (Abstr.) Phytopathology 47: 524. 1957.

Methods to provide data on population dynamics and ecology of common plant parasitic nematodes are described. These consist of counting various populations of plant parasitic nematodes, transforming the low numbers to $\sqrt{X + 0.5}$ and to log (X + 1); high numbers to $\sqrt{X}$ and log X. Transformed data were studied in 290 analyses of variance with I.B.M. facilities. Significant intraseasonal fluctuations and crop-season reductions occurred in 41.5 and 55.4 percent of analyses, respectively.

201. KLEIN, H. H. and C. C. ALLISON. A rapid method of screening of nematocides in the greenhouse. (Abstr.) Phytopathology 47: 21. 1957.

Four-day old Green Prolific cucumber seedlings are transplanted into the chemically treated and untreated root-knot nematode (Meloidogyne spp.) infested soils. Root knot severity is assayed 7 days after seedlings are transplanted and is determined on the basis of the percentage of root system knotted.

202. LEAR, BERT. Soil fumigation for nematode control. Agr. Chem. 12 (8): 40-43. 1957.

This is a good general review followed by a discussion of the use of 1,2-dibromo-3-chloropropane, sodium N-methyl dithiocarbamate, and a fumigant consisting almost entirely of dichloropropene. The author then discusses row placement applications, split dosage applications, postplanting sidedress applications, and water applications. The author concludes by discussing new application equipment, including constant head with metering soil and ground wheel driven metering pump.

204. MANZELLI, M. A. and V. H. YOUNG, Jr. Tolerance of plants to V-C 13 Nemacide. Plant Dis. Reptr. 41: 195-200. 1957.

This paper presents data on the tolerance of treated plants or plant seeds to various concentration levels of V-C 13 Nemacide (O-2,4-dichlorophenyl O, O-diethyl phosphorothioate).

205. PEACOCK, F. C. The effect of chemical treatments on root knot nematodes in the Gold Coast. Empire J. Expt. Agr. 25: 99-107. 1957.

D-D mixture lasted only one crop following injection, whereas ethylene dibromide and tetrachlorobutadiene showed effects on a second screening crop.

206. SCHULDT, P. H. and H. BLUESTONE. Nematocidal properties of 3,4-dichlorotetrahydrothiophene-1,1-dioxide (PRD). Boyce Thompson Inst. Contrib. 19: 63-75. 1957.

207. TAYLOR, A. L., JULIUS FELDMESSER and W. A. FEDER. A new technique for preliminary screening of nematocides. Plant Dis. Reptr. 41: 527-530. 1957.

The technique described in the article is so designed that very small amounts of the chemicals are required and the test can be reproduced within reasonable limits so that a comparison of the toxicity of the test chemical and that of a standard chemical can be made.

208. YOUNG, B. H. The activity of V-C 13 type nematocide. Assoc. South. Agr. Workers Proc. 54: 222-223. 1957.

Chemical control of nematodes in the soil has been obtained with a non-fumigant type nematocide known commercially as V-C 13 Nemacide. The active ingredient is O-2,4-dichlorophenyl, O-O-diethyl phosphorothioate. This chemical possesses very little volatility and is relatively stable after application, therefore its residual life in the soil is of long duration. It appears to be non-phytotoxic at recommended rates. Plant parasitic nematodes controlled include dagger, lance, meadow, root-knot, spiral, sting, stubby, and stylet. Root knot can be controlled for 3 years, other nematodes for from 1 to 2 years.

Nematocides -- Fruits

209. BAINES, R. C. et al. Control of the citrus nematode and Phytophthora spp. by Vapam. Plant Dis. Reptr. 41: 405-414. 1957.

The citrus nematode, Tylenchulus semipenetrans, was effectively controlled when 274 to 475 pounds of Vapam per acre were applied in 6 to 12 surface inches of water in basins. The treatments also decreased the number of saprophytic fungi in the soil. Both Phytophthora citrophthora and P. parasitica were killed by 400 pounds of Vapam per acre applied in 5 to 6 surface inches of water in basins on sandy loam soils. Control of the citrus nematode and brown rot fungi together was unsatisfactory under field conditions.

210. BAINES, R. C. and J. P. MARTIN. Fumigants for citrus nematode. Calif. Agr. 11 (6): 13-15. 1957.

211. BAINES, R. C. Results with Vapam to control nematodes, fungi. Calif. Citrogr. 42: 192, 202, 204, 206-209. 1957. (Rev. Appl. Mycol. 36: 584. 1957.)

Tests were conducted in California on seven methods of applying Vapam for the control of citrus brown rot (Phytophthora spp.). On fine sandy loam a reduction of approximately 56 percent in the number of fungi in the top 2 feet of soil was obtained by 300 pounds of Vapam per acre applied in water by furrows or sprinklers, but P. syringae was not affected. Effects varied according to method of application. Application of the chemical in surface water appears to hold some promise for control of Phytophthora spp. but it has yet to be seen how long the effects of a treatment endure.

212. DAVIDSON, J. H. and C. E. DIETER. Give your cherries a good start; fumigate before you plant. Am. Fruit Grower West. Ed. 77 (9): 10-11. 1957.

In soils where good cultural conditions have been followed and poor cherry growth occurs, soil fumigation as a preplanting treatment should be tried. Small areas can be treated with odorized methyl bromide. Large areas can be treated with ethylene dibromide, using a chisel type applicator as either an over-all or a 8- to 10-foot wide band treatment, the soil being sealed after treatment by cultipacking.

213. MORGAN, O. D. and W. F. JEFFERS. The effect of fumigation and heat treatment on root-knot nematode and black root rot of strawberries. Plant Dis. Reptr. 41: 825-831. 1957.

Treatment of Robinson variety of strawberries with 1,2-dibromo-3-chloropropane at 68 and 136 pounds of 25 percent material per acre, following a fall treatment with 60 gallons of D-D (1,3 dichloropropene; 1,2 dichloropropane) per acre, gave excellent control of root knot nematode (Meloidogyne). The low rate was as effective as the high rate. A fall treatment with two 30-gallon applications of D-D 10 days apart gave unsatisfactory control of root knot. Control of the black root rot complex with all treatments was inconclusive.

214. MORGAN, O. D. The effect of various control measures on two parasitic nematodes of strawberry. (Abst.) Phytopathology 47: 452. 1957.

Treatment against Meloidogyne hapla and a species of Pratylenchus showed Nemagon to be effective.

215. SUIT, R. F. and E. P. DuCHARME. Searching for better control of spreading decline. Sunshine State Agr. Res. Rept. 2 (2): 7. 1957.

216. VUITTENEZ, A. Lutte preventive contre le court-noué de la vigne par la désinfection chimique du sol avant plantation. (Preventive control of court-noué of the vine by chemical disinfection of the soil before planting.) C. R. Acad. Agric. Fr. 43: 185-186. 1957.

Compared with control plants (height 80 cm), the mean heights of the

treated plants were: DD, 185 cm; methyl bromide-carbon tetrachloride-dichloroethane mixture, 131 cm; carbon disulfide, 135 cm. The best treatments were not only effective for the virus disease court-noué but also were highly active against nematodes.

Nematocides -- Mechanism of Action

217. CALL, F. The mechanism of sorption of ethylene dibromide on moist soils. J. Sci. Food Agr. 8: 630-639. 1957.

The purpose of this work was to study in more detail the sorption of ethylene dibromide on soils.

218. CALL, F. Soil fumigation. IV. Sorption of ethylene dibromide on soils at field capacity. J. Sci. Food Agr. 8: 137-150. 1957.

Sorption of ethylene dibromide was studied in the presence of air on 20 different soils at moisture contents corresponding to field capacity. The soils ranged from coarse sands through silts and clays to heavy peats. All isotherms were linear and the sorption coefficient (slope of the isotherm) could be correlated with surface area, with organic matter content, with moisture content, and less closely with clay content.

219. CALL, F. Soil fumigation. V. Diffusion of ethylene dibromide through soils. J. Sci. Food Agr. 8: 143-150. 1957.

The diffusion of ethylene dibromide vapor through soils of different types has been studied. Both unsteady-state and steady-state coefficients agree with theoretical values calculated from known soil properties. Blocked pores are an important factor in the steady-state but not in the unsteady-state, and sorption of vapor on the soil has a great influence on the unsteady-state coefficient only.

220. CALL, F. Soil fumigation. VI. The distribution of ethylene dibromide round an injection point. J. Sci. Food Agr. 8: 591-596. 1957.

It is concluded that diffusion is the most important factor controlling distribution. The concentration-time products (C.T.) have been calculated at various distances from the injection point and an L.D.-50 range has been derived from the C. T.-distance curves. These L.D.-50 ranges were found to have a linear relationship with the soil porosity for all soils at two temperatures.

221. GORING, C. A. I. and C. R. YOUNGSON. Factors influencing nematode control by ethylene dibromide in soil. Soil Sci. 83: 377-389. 1957.

Major variation in nematode control occurs in the vertical but not in the horizontal direction. Gravity had little or no influence on the degree of control obtained. The rate of diffusion of ethylene dibromide decreased when porosity was decreased by soil compaction, but ultimate nematode control was not affected. Increase of soil moisture from 7.5 to 20 percent resulted in increased control. The addition of 5 percent steer manure or oak leaf mold caused considerable decrease in control. Control was improved with increased depths and closer spacing of injections.

222. HOLLIS, J. P., M. J. FIELDING, and E. J. WEHUNT. Action of fumigants on nematodes as related to nematocide specifications. (Abstr.) Phytopathology 47: 524. 1957.

Actions of four fumigants on populations of five genera of plant parasitic nematodes were analysed in 22 field tests. The effectiveness of the several nematocides varied directly with vapor pressure in initial nematode kills (after 2 weeks) and inversely with vapor pressure in reducing populations (all season). In respect of capacity of populations for recovery after treatment the genera tested ranked as follows: weak -- Tylenchorhynchus; moderately weak -- Pratylenchus; strong -- Trichodorus, Tylenchus, and Psilenchus.

223. SCHULDT, PAUL H., H. P. BURCHFIELD and HENRY BLUESTONE. Stability and movement studies on the new experimental nematocide 3,4-dichlorotetrahydrothiophene-1, 1-dioxide in soil. (Abstr.) Phytopathology 47: 534. 1957.

In moist soil in a closed jar at an initial concentration of 100 μg/g PRD had a half-life at pH 6.5 of 20 days at 32° C, 45 days at 22° and 115 days at 10°. PRD persisted in dry soil three times as long as in moist soil. It is sensitive to alkali. As long as PRD remains in soil, it moves downward as a result of rainfall and upward during drying periods.

224. TORGESON, D. C., D. M. YODER and J. B. JOHNSON. Biological activity of Mylone breakdown products. (Abstr.) Phytopathology 47: 536. 1957.

Mylone (3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione) hydrolyzes soon after it has been applied. It was believed that the hydrolysis products or a combination of them were responsible for the fungicidal, nematocidal, and herbicidal properties of the compound. Among the materials identified were methylisothiocyanate, formaldehyde, hydrogen sulfide, and monomethylamine. None of these products when used alone at proper concentrations was sufficiently fungicidal to inhibit Pythium sp. in soil. Either a combined fungicidal effect, or the recombination of these materials into an active fungicide is indicated.

Nematocides -- Other Crops

225. ENDO, B. Y. and J. N. SASSER. The effectiveness of various soil fumigants for control of the soybean cyst nematode. (Abstr.) Phytopathology 47: 9. 1957.

Report on relative effectiveness of doses of D-D, Dowfume W-85 (1,2-dibromoethane), methyl bromide, Nemagon (1,2-dibromo-3-chloropropane), and Telone (1,3-dichloropropene).

226. GOOD, J. M. and S. A. PARHAM. Control of sting nematodes on upland cotton by soil fumigation. (Abstr.) Phytopathology 47: 312. 1957.

Yields of Plains cotton, a wilt-resistant variety, were significantly greater in 1956 in plots fumigated with Dowfume W-40 (41 percent 1,2-dibromoethane), Nemagon, Dorlone (78 percent dichloropropenes; 19 percent 1,2-dibromoethane), or D-D. Average seed cotton yields were 1606, 1565, 1026, 885, and 203 pounds per acre for plots treated with the chemicals named, in that order, plus the check.

227. HANSBROUGH, THOMAS, and JOHN P. HOLLIS. The effect of soil fumigation for the control of parasitic nematodes on the growth and yield of loblolly pine seedlings. Plant Dis. Reptr. 41: 1021-1025. 1957.

The results of this study indicate that the practice of soil fumigation for nematode control offers considerable promise for increasing the production and improving the quality of loblolly pine seedlings in nurseries infested with certain parasitic nematodes.

228. JENSEN, HAROLD J. and CHESTER E. HORNER. Peppermint decline caused by Longidorus sylphus can be controlled by soil fumigation. (Abstr.) Phytopathology 47: 18. 1957.

D-D, Dowfume W-85, and Nemagon were all effective.

229. LOWNSBERY, B. F. and S. A. SHER. Soil fumigation for control of the root lesion disease of walnuts. (Abstr.) Phytopathology 47: 527-528. 1957.

Pressure-chisel machine applications of D-D, Dowfume W-85, and Nemagon at walnut planting sites in three California orchards heavily infested with Pratylenchus vulnus have resulted in satisfactory growth of California black and Paradox hybrid walnut replants. Neither of these root stocks had grown satisfactorily at untreated control sites. Duration of benefits of preplanting fumigation is uncertain because soil populations of root lesion nematodes returned to pretreatment levels in two seasons.

230. MORGAN, O. D. Control of Fusarium wilt and root knot nematode of tobacco with soil

fumigants. Plant Dis. Reptr. 41: 27-32. 1957.

Three tests for control of root knot nematode (Meloidogyne spp.) also gave definite control of Fusarium wilt. Yields were increased markedly in the three tests by use of ethylene dibromide at 5 gallons to the acre. A split treatment of EDB at 2.5 - 2.5 gallons per acre, used in one of the tests, also showed control of Fusarium wilt and increased weight of tobacco over the controls, as did D-D at 20 gallons per acre.

231. PADEN, W. R. and J. A. RILEY. Yield response of cotton on Lakeland sand from fumigation with D-D. Assoc. South. Agr. Workers Proc. 54: 73-74. 1957.

Tests in South Carolina have shown that on soils commonly infested with the various species of nematodes the yields of cotton can be greatly increased through soil fumigation. Following fumigation the cotton plant tends to develop a larger root system and is, therefore, better able to withstand drouth conditions.

232. SHER, S. A. Response of roses to field fumigation for lesion nematode. (Abstr.) Phytopathology 47: 31. 1957.

Fumigation for Pratylenchus vulnus on poorly growing roses was carried out with a number of soil fumigants. The average dry weight in grams from each treatment and the checks was as follows: Chloropicrin at 33 gallons per acre, 82; Dowfume W-85 at 8 gallons per acre, 71; D-D at 40 gallons per acre, 70; Vapam injection at 40 gallons per acre, 59; Vapam drench at 40 gallons per acre, 39; check, 30.

233. YOUNG, V. H. Jr., A. M. SOMERVILLE Jr. and J. L. CARNES. Nematode control in potted ornamentals with V-C 13 Nemacide. Plant Dis. Reptr. 41: 271-277. 1957.

Root-knot, spiral and meadow nematodes in boxwood, Japanese holly, and privet.

Nematocides -- Vegetables

234. DARLING, H. M. Control of the potato rot nematode in Wisconsin. (Abstr.) Phytopathology 47: 7. 1957.

Ethylene dibromide has given the most promising results. Split application (plow sole) of this chemical at a total rate of 6 gallons an acre (4 gallons on the first and 2 gallons on the second) were made in the spring and fall. The fall application gave control approaching eradication.

235. MINZ, G. Experiment on control of root-knot nematodes. (In Hebrew) Hassadeh 37: 415-416. 1957.

Successful control of root-knot nematodes prior to planting spring tomatoes was obtained by use of D-D, ethylene dibromide, and Nemagon.

236. NIELSEN, L. W. and J. N. SASSER. The relationship of nematocides, dosage, carrier, and soil types to the control of root-knot in sweetpotato. (Abstr.) Phytopathology 47: 314. 1957.

Dowfume W-85 and D-D were applied for control of Meloidogyne incognita acrita in sweetpotatoes. Application was at 0, 1/2, 1, and 2 times the recommended dosages of 10 gallons per acre for D-D and 4 1/2 gallons per acre for Dowfume W-85. Fumigants were applied in two forms: liquids and impregnated vermiculite. The fumigants carried on vermiculite were more effective at the lower dosages than comparable liquid treatments, but they affected yields adversely at the high dosage. This was most serious in heavy soil.

237. OVERMAN, A. J. and D. S. BURGIS. Fungicidal, herbicidal and nematocidal effects of fumigants applied to vegetable seedbeds on sandy soil. Proc. Fla. hort. Soc. 69: 250-255. 1957. (Rev. Appl. Mycol. 36: 633. 1957.)

From soil fumigation treatments carried out at Bradenton, Florida, it was concluded that the addition of Nemagon or D-D to the allyl alcohol drench gave a soil treatment that was effective as a fungicide, a nematocide,

and a herbicide. Vapam and Crag Mylone were also effective in all three categories.

238. STONE, L. E. W. Observations on the control of potato-root eelworm (Heterodera rostochiensis Wollenw.) under glass by D-D and solubilized p-m cresol. Ann. Appl. Biol. 45: 256-260. 1957.

D-D injected at 400 pounds per acre into light loam in two glasshouses in Wiltshire killed 93.9 and 91.5 percent of the eelworm population, respectively, in the 0.9 inch soil layer. Combined treatments, using solubilized cresols as a surface seal instead of water, increased the kill in the 0.3 inch soil layer, but a higher degree of kill here is still required.

NEMATODES

See also 156

239. APEL, A. and L. KÄMPFE. Beziehungen zwischen Wirt und Parasit im Infektionsverlauf von Heterodera schachtii Schmidt in kurzfristigen Topfversuchen. I. Infektionsgang bei verschiedenen Wirtspflanzen. Nematologica 2: 131-143. 1957.

The normal source of invasion and development of beet eelworm in sugar beet, summer turnip rape, swede rape, and white mustard was studied during the first 21 days of plant growth. There were no appreciable differences in the time of appearance of the different larval stages in the different host plants. Among other things which contribute to a high larval density is relatively slow growth in root length.

240. BAUSERMAN, H. M. and R. F. OLSON. Nematode cyst hatch rate as influenced by fractions of beet root juice. Am. Soc. Sugar Beet Technol. J. 9: 387-392. 1957.

241. BIRCHFIELD, W. The burrowing nema situation in Florida. J. Econ. Ent. 50: 562-564. 1957.

A general review covering the organism Radopholus similis under the topics: taxonomy and description; life cycle and pathogenicity; host plants and geographic distribution. The disease (spreading decline) is discussed under economic importance, research and control.

242. BIRCHFIELD, WRAY. Observations on the longevity without food of the burrowing nematode. Phytopathology 47: 161-162. 1957.

The burrowing nematode (Radopholus similis) was not recovered from infested soil and roots after 4 months when placed 3 feet under the ground surface or in temperature tanks maintained at 74° to 76° F. It survived about 66 days at room temperature on water agar and in water.

243. BOSHER, J. E. and W. NEWTON. Pratylenchus penetrans in clonal apple stocks. (Abstr.) Phytopathology 47: 4. 1957.

Dissemination of Pratylenchus penetrans in the roots of apple stocks is favored by the use of layering methods used in propagating clonal stocks. Conspicuous root injury and reduced growth in 2-year-old stocks were associated with populations of Pratylenchus exceeding 80 per gram of roots. Soil fumigation by injection of Nemagon at rates of 10 to 40 gallons per acre in the root zone of 2-year-old apple stocks significantly reduced total nematode populations but did not completely eliminate Pratylenchus.

244. BRAUN, ALVIN J. and J. A. KEPLINGER. Nematodes -- are they a limiting factor in grape production in New York? Farm Res. 23 (1): 9. 1957.

Nematodes found associated with grape roots included Xiphinema, Helicotylenchus, Pratylenchus, Paratylenchus, Criconemoides.

245. BROWN, E. B. Lucerne stem eelworm -- a serious threat to lucerne growing. Agriculture (London) 63: 517-528. 1957.

246. BURMAN, J. H. and J. JENKS. Our invisible allies in the soil; minute soil fungi that

prey upon eelworms. Mother Earth 9: 857-863. 1957.

247. CAPSTICK, C. K., D. C. TWINN and J. S. WAID. Predation of natural populations of free-living nematodes by fungi. Nematologica 2: 193-201. 1957.
Fungal predation on nematodes of the forest litter.

248. CARROLL, J., J. McKAY and M. HANNIGAN. Propagation of eelworm-free stocks of strawberry runners. Roy. Dublin Soc. Econ. Proc. 4: 75-82. 1957.

249. CHAPMAN, RICHARD A. The effects of aeration and temperature on the emergence of species of Pratylenchus from roots. Plant Dis. Reptr. 41: 836-841. 1957.
Because of the long period of time that roots must be kept before they are exhausted of nematodes, some means of aeration is essential if frequent changes of water or washings are to be avoided. Of the methods tried here, passing air through jars and agitation on a shaker were the most effective.

250. CHITWOOD, B. G. and W. BIRCHFIELD. Citrus-root nematode, a native to Florida soils. Plant Dis. Reptr. 41: 525. 1957.
Tylenchulus semipenetrans has been found on the roots of the native climbing hempweed (Mikania batatifolia) in several places where no record of cultivation is known.

251. CHITWOOD, B. G. and R. P. ESSER. Pathogenicity tests involving Meloidodera floridensis, a nematode associated with slash pine. Plant Dis. Reptr. 41: 603-604. 1957.
Meloidodera floridensis reproduced and increased itself on Pinus elliotti seedlings without apparent injury to the roots or tops.

252. CHRISTIE, J. R. The yellow disease of pepper (Piper), and spreading decline of citrus. Plant Dis. Reptr. 41: 267-268. 1957.
The author here stresses the great similarity of yellows disease of pepper, Piper nigrum, on the island of Banka (where the stand of 22 million trees has been reduced to 2 million) and spreading decline of citrus in Florida. There is little doubt that in both cases the causal agent is the burrowing nematode Radopholus similis.

253. CLARKE, O. F., R. C. BAINES and P. W. MOORE. Mulches show no effect in controlling nematodes. Calif. Citrog. 42: 499. 1957.

254. COLBRAN, R. C. The strawberry root knot nematode. Qd. Agr. J. 83: 256-258. 1957.

255. CRALLEY, E. M. The effect of seeding methods on the severity of white tip of rice. (Abstr.) Phytopathology 47: 7. 1957.
White tip caused by Aphelenchoides oryzae was much less severe when rice was seeded in water than when it was drilled. It would appear that water seeding of rice offers a simple and practical method for the control of white tip.

256. DONCASTER, C. C. Growth, invasion, and root diffusate production in tomato and black nightshade inoculated with potato root eelworm. Nematologica 2: 7-15. 1957.
The results of the experiments show a logical relationship between hosts and parasite (Heterodera rostochiensis). Each year, plant growth was reduced by eelworm attack, but to a lesser degree in the unfavorable host plant, black nightshade (Solanum nigrum).

257. DROPKIN, VICTOR H. and GEORGE C. MARTIN. The inhibition of hatching of nematode eggs under moisture stress. (Abstr.) Phytopathology 47: 519. 1957.
Solutions of various salts and of dextrose at a molar concentration equivalent to a potential osmotic pressure of 15 atmospheres prevented emergence of larvae from eggs of Meloidogyne spp. and Heterodera

rostochiensis. The response of nematode eggs to moisture stress is probably an important factor in the distribution and infectivity of plant parasitic nematodes.

258. DUNN, E. Cereal root eelworm. Scottish Agr. 36: 146-148. 1957.
Includes distribution and economic effect of Heterodera major (particularly in Scotland), life cycle, symptoms, and host range.

259. DUNNETT, J. M. "Embedded cysts" in relation to the utilisation of potato root eelworm resistance. Roslin. Scot. Plant Breeding St. Ann. Rept. pp. 50-56. 1957.
Certain populations of the potato root eelworm develop on clones of the host which in general are resistant to the nematode. The significance of the "occasional" cysts which arise on the roots of these resistant plants has been discussed previously. This paper draws attention to the development on the tubers of resistant plants of cysts which develop in situ and thus may be described as "embedded cysts".

260. DUNNETT, J. M. Variation in pathogenicity of the potato root eelworm (Heterodera rostochiensis Woll.) and its significance in potato breeding. Euphytica 6: 77-89. 1957.
An eelworm population has been found which has overcome the resistance of certain clones of Solanum tuberosum subsp. andigena used as a source of resistance.

261. ELLENBY, C. An investigation into the possibility of parthenogensis in the potato root eelworm Heterodera rostochiensis Wollenweber. Nematologica 2: 250-254. 1957.
From the data presented the author concludes that parthogenesis does not normally take place.

262. EPPS, J. M. Soybean cyst nematode found in Tennessee. Plant Dis. Reptr. 41: 33. 1957.
Heterodera glycines found in Lake County, western Tennessee.

263. FARRAR, LUTHER L. Plant parasitic nematode genera found in the vicinity of small grain roots in Georgia. Plant Dis. Reptr. 41: 703-704. 1957.
A total of 87 samples was collected from 48 counties throughout the State. Parasitic nematodes were observed in each sample. Pratylenchus sp. was the most frequently observed.

264. FASSULIOTIS, GEORGE. Role of the male in reproduction of the golden nematode. (Abstr.) Phytopathology 47: 11. 1957.
It appears that the definite shape of the female is not dependent on fertilization and that the golden nematode, Heterodera rostochiensis, is not capable of parthenogenesis.

265. FASSULIOTIS, GEORGE. X-ray studies on the golden nematode, Heterodera rostochiensis. (Abstr.) Phytopathology 47: 520. 1957.
Cysts of the golden nematode were irradiated with dosages of 5, 10, 20, 40, 80, 160 and 360 kr. There was no effect on emergence at the five lower levels. At 160 kr. hatching was delayed 7 days. At 360 kr. only 15 percent of larval emergence occurred. Infectivity of larvae was inversely proportional to the dosage. No mature females were recovered from roots inoculated with larvae receiving 360 kr.

266. FEDER, WM. A. and JULIUS FELDMESSER. Additions to the host list of Radopholus similis, the burrowing nematode. Plant Dis. Reptr. 41: 33. 1957.
Pot tests indicate the following to be additional hosts of the burrowing nematode: carrot, beet, bean, tomato, squash, corn, White Dutch clover, pea, pepper, okra, radish, cantaloupe, broccoli, watermelon, rye, Bahia grass, Bermuda grass, carpet grass, alfalfa.

267. FEDER, WILLIAM A. and JULIUS FELDMESSER. Observations on the absence of an internal microflora of surface-sterilized Radopholus similis. (Abstr.) Phytopathology 47: 11. 1957.

Radopholus similis was cleaned by soaking groups of 25 nematodes for 5 minutes in mercuric chloride 1/1000, followed by three serial washings in sterile distilled water. Such nematodes were fully infective when placed on citrus roots. No bacteria or fungi grew from cleaned nematodes placed intact on various agar media or cut aseptically after placement on the agar. The agar media used were potato-dextrose nutrient, potato-dextrose peptone, and yeast extract.

268. FELDMESSER, JULIUS and WM. A. FEDER. Survival of Radopholus similis in field soil subjected to drying and to elevated temperatures. (Abstr.) Phytopathology 47: 11. 1957.

Radopholus similis survived after 27 hours in one test in which soil moisture fell from 3.0 to 0.9 percent, and soil temperatures were over 100° F for 12 hours with a high of 115° during that period.

269. FENWICK, D. W. Red ring disease of coconuts in Trinidad and Tobago. Report, London: Colonial Office, 55 pp. 1957.

The disease is caused by Aphelenchoides cocophilus. It appears to be soil-borne, with entry through the roots and then into the base of the tree.

270. FERRIS, J. M. Effect of soil temperature on the life cycle of the golden nematode in host and nonhost species. Phytopathology 47: 221-230. 1957.

Soil temperature had a marked effect on the life cycle of Heterodera rostochiensis in the three host species of Solanum studied; in the single nonhost species of Solanum studied temperature had only a slight effect. Fewer larvae penetrated any of the species at 85° F than at either 65° or 75°. At 85° no larvae developed beyond the second stage in any of the hosts. Periods at 85° for longer than 5 days caused degeneration of the nematodes that had developed.

271. FERRIS, VIRGINIA R. and BENJAMIN M. SIEGEL. Electron microscopy of golden nematode cyst wall. Nematologica 2: 16-18. 1957.

An exocuticle and an endocuticle are visible in electron micrographs of ultra thin sections of golden nematode cyst wall. More detail can be seen in the endocuticle than has been reported from light microscope studies. Details of the exocuticle described from light microscope observations are not imaged in the electron microscope.

272. FRANKLIN, MARY T. Note on the nomenclature of the cereal root eelworm. Nematologica 2: 149-151. 1957.

In current literature the cereal root eelworm is referred to sometimes as Heterodera major, sometimes as H. avenae. This disagreement as to its correct scientific name is bound to lead to confusion. Following the principles laid down at the meeting of the International Commission on Zoological Nomenclature held in Paris in July 1948, it is clear that the name major, although given later than avenae, is the correct specific name because avenae was not published together with an adequate "indication".

273. GEORGHIOU, G. P. Records and notes on the plant parasitic nematodes of Cyprus. Cyprus Dept. Agr. Tech. Bull. TB-3, 5 pp. 1957.

274. GOFFART, H. Bemerkungen zu einigen Arten der Gattung Meloidogyne. Nematologica 2: 177-184. 1957.

Species of Meloidogyne that have been found in Germany are

M. hapla and M. arenaria subsp. thamesi. M. javanica was also found in roots sent for examination. Some perineal patterns are described which previously had not been correctly identified. They belong to the arenaria and incognita groups. M. hapla is of frequent occurrence in the field and attacks many weeds.

275. GOLDEN, A. MORGAN. Occurrence of Radopholus gracilis (Nematoda: Tylenchidae) in the United States. Plant Dis. Reptr. 41: 91. 1957.
Radopholus gracilis was found in soil and certain root samples from monocotyledonous plants growing in moist soil along the edge of the Pajaro River near Watsonville, California.

276. GOUGH, H. C. The pea root eelworm. Agr. Rev. 2 (11): 44. 1957.

277. HAASE, W. Feste Mietenplätze zur Minderung der Kartoffelnematoden -- Verschleppung! Deut. Landwirt. 8: 399-400. 1957.

278. HEGGE, A. H. Soybean cyst nematode in Missouri. Plant Dis. Reptr. 41: 201. 1957.
Nine fields have been found to be infested with Heterodera glycines to date, all within 1 to 5 miles of the Mississippi River.

279. HESLING, J. J. The hatching response of Heterodera major (O. Schmidt) to certain root diffusates. Nematologica 2: 123-125. 1957.
The experiments indicate that the hatching of Heterodera major is not due to the stimulus of root diffusate, although the possibility of an ephemeral stimulant being produced by the roots remains as a possibility.

280. HESLING, J. J. Heterodera major O. Schmidt 1930 on cereals -- a population study. Nematologica 2: 285-299. 1957.
The susceptibility of three cereals, i.e., the effect of the eelworm on them, appears to be greatest in oats, followed by wheat and barley. The number of new cysts may be expressed as a percentage of half the original number of larvae and this percentage is termed "cyst-efficiency" by the author. The "cyst-efficiency" was found to be low in all of the tests, thus for this nematode there seems to be a great wastage of larvae which do not become cysts. The reason for this is not known.

281. HOLLIS, JOHN P. Cultural studies with Dorylaimus ettersbergensis. Phytopathology 47: 468-473. 1957.
The nematode was cultured in water-agar inoculated with a series of microorganisms. It was found that the nematode inserted its spear and fed on vegetative cells of the algae (blue-green and green), on cysts of the protozoan, and on conidia of the fungus. Feeding involved the forcible removal of protoplasm from the cell and its duration in an individual cell was determined by the type of microorganism attacked. The nematode fed also on other nematodes.

282. HOLLIS, JOHN P. Microbial host range of Dorylaimus ettersbergensis. (Abst.) Phytopathology 47: 16. 1957.
Dorylaimus ettersbergensis feeds parasitically in water-agar cultures on globose cells of a blue-green alga (Chroococcus sp.), green algae (Chlorella vulgaris and Tetraedron sp.), a protozoan (Drepanomonas sp.), and a fungus (Cephalothecium sp.). The two algae proved to be the most effective hosts.

283. HOLLIS, JOHN P. and TITUS JOHNSTON. Microbiological reduction of nematode populations in water-saturated soils (Abstr.) Phytopathology 47: 16. 1957.
Populations of Tylenchorhynchus martini and T. acutus were related inversely to the amount of flooding and rainfall in rice and soybeans, respectively, in soil fumigation tests. The effect of microorganisms in water-saturated soils was demonstrated experimentally.

284. HORN, A. VON. Rübenbau und Rapszwischenfrucht. Zucker 10: 351-352. 1957.

285. JENKINS, W. R. and COURSEN, B. W. The effect of root-knot nematodes, Meloidogyne incognita acrita and M. hapla, on Fusarium wilt of tomato. Plant Dis. Reptr. 41: 182-186. 1957.
Some relationship other than merely providing an entry for the fungus exists between Fusarium oxysporum f. lycopersici and Meloidogyne hapla and M. incognita acrita in the Fusarium wilt of tomato. In both semi-resistant and resistant varieties, the incidence of wilt was greater in the presence of the nematode.

286. JENKINS, W. R. et al. Nematodes associated with crop plants in Maryland. U. of Md. Agr. Expt. Sta. Bull. A-89. 1957.
A state-wide survey for the occurrence of plant parasitic nematodes, involving more than 1200 collections, showed the most frequently occurring genera to be: Aphelenchus, Ditylenchus, Pratylenchus, Tylenchorhynchus, and Tylenchus.

287. JENSEN, HAROLD J., LINDSAY B. LORING and JORER LEWIS. Sugar beet nematode found in the Ontario-Nyssa area of Oregon. Plant Dis. Reptr. 41: 201. 1957.
Heterodera schachtii. This is the larger of the two major areas producing sugar beets in Oregon.

288. JOHNSTON, TITUS. Further studies on microbiological reduction of nematode population in water-saturated soils. (Abstr.) Phytopathology 47: 525-526. 1957.
Tylenchorhynchus martini was added to a rice field soil and incubated at moisture levels of 11, 25, 50, 75, and 100 percent field capacity and at saturation. Survival was highest between 40 and 60 percent and lowest at 11 percent and saturation. A species of Clostridium produced a toxic principle that killed nematodes in from 15 seconds to 2 minutes. Activity of the substance was partially reduced by filtration, by agitation for 15 minutes, and by heating at 100° C for 15 minutes. Anaerobic bacteria may be a factor in the reduction of nematode populations in water saturated soils.

289. JONES, F. G. W. Soil populations of beet eelworm (Heterodera schachtii Schm.) in relation to cropping. III. Further experiments with microplots and with pots. Nematologica 2: 257-272. 1957.
The results of a rotational experiment in microplots containing Chatteris soil are given together with some criticisms of the layout. Further results are given of the effects of beet and other host plants on the beet eelworm population of three sets of microplots containing soil from Oxlode, Spalding and Cantley, and of a separate experiment employing large pots. Increase in beet eelworm population occurred in the Chatteris and Spalding soil, a decrease in Oxlode soil and no change in the Cantley soil.

290. JONES, H. L. Battle in the citrus grove. Am. Fruit Grower West. Ed. 77 (2): 15, 51-52. 1957.

291. KINCAID, RANDALL R. and NATHAN GAMMON. Effect of soil pH on the incidence of three soil-borne diseases of tobacco. Plant Dis. Reptr. 41: 177-179. 1957.
Test crops of tobacco have been grown under shade in soil adjusted to five different pH levels. Blackshank (Phytophthora parasitica var. nicotianae) varies directly with pH, differences being highly significant. Root knot (Meloidogyne spp.) and coarse root (Pratylenchus sp.) varied inversely with soil pH, differences being significant.

292. KONDO, T. On the seasonal fluctuation of the population density of Meloidogyne incognita acrita in the sweetpotato field. (In Japanese.) Botyu-Kagaku 22: 144-149. 1957.

293. KOSKI, J. T. The burrowing nematode in Florida. Assoc. South Agr. Workers Proc. 54: 142-143. 1957.
Radopholus similis. A general discussion of the burrowing nematode problem.

294. KRADEL, J. Kartoffelnematode bedroht unseren Kartoffelanbau. Mitschurin Bewegung 6: 652-657. 1957.

295. KRUSBERG, L. R. and L. W. NIELSEN. The influence of root-knot nematodes on the growth of Porto Rico sweetpotato. (Abstr.) Phytopathology 47: 21. 1957.
A demonstration that Meloidogyne incognita acrita stunts sweetpotato.

296. LEWIS, FREDA J. and W. F. MAI. Survival of encysted eggs and larvae of the golden nematode to alternating temperatures. (Abstr.) Phytopathology 47: 527. 1957.
Sterilized soil infested with golden nematode (Heterodera rostochiensis) cysts was maintained air dry and at seed bed moisture in 1-pint containers. Both soils were shifted from one temperature to another (-5° and 75° F) at intervals of 1, 3, 7, 14, and 28 days for a period of 169 days. Viability of the cyst contents was tested at the end of the test period. In dry soil, viability was similar following all treatments. In moist soil, greater losses in viability resulted from alternating temperatures than from constant temperatures. Some individuals survived all of the treatments.

297. LINDHARDT, K. Ditylenchus dipsaci in gardening. (In Danish) Horticultura 11: 123-127. 1957.

298. LINDHARDT, K. The sugar beet nematode. (In Danish) Landbonyt 11: 416-418. 1957.
Heterodera schachtii.

299. LORDELLO, LUIZ GONZAGA E. Dalias e nematodeos. Chacaras e Quintais 95:493. 1957.
A species of Meloidogyne on dahlia tubers is reported and symptoms are described.

300. LORDELLO, L. G. E. A note on nematode parasites of red anthurium (Anthurium andraeanum Lind.) with a description of Rotylenchus boocki n. sp. Nematologica 2: 273-276. 1957.
Samples of diseased roots of stunted plants of red anthurium (Anthurium andraeanum) were attacked by Meloidogyne inornata, Helicotylenchus nannus, and an undescribed form of Rotylenchus. A description of Rotylenchus boocki n. sp. is given in this paper.

301. MAI, W. F. et al. Nematode genera found in New York State orchards. Plant Dis. Reptr. 41: 402-404. 1957.
Potentially pathogenic nematodes appear to be widely distributed throughout the orchard soils of New York State. In some orchards the evidence is strong that attack by Pratylenchus penetrans is an important factor in the decline of cherry and to a lesser extent of apple trees.

302. MAI, W. F. and K. G. PARKER. Nematodes cause serious root disease of cherry and other tree fruits in western New York. N. Y. State Hort. Soc. Proc. 102 Ann. Meeting 77-81. 1957.

303. MARTIN, G. C. Four kinds of root-knot nematode. Rhodesia Agr. J. 54: 324-326. 1957.

304. MEAD, HOWARD. One-year leys on clover-sick land. Plant Path. 6: 90-91. 1957.
In the area of the Northumberland and Durham coalfield farmers have been puzzled by "white hay" (hay without legumes) which has been shown to be due to killing of the clover plants by the bulb and stem nematode (Ditylenchus dipsaci). It was decided to put in tests using legumes

considered to be eelworm-resistant. The tests show that the use of alsike and big-leaved white clover can contribute substantially to hay yields on infested land.

305. MILES, H. W. Crop protection. Nature 179: 1339-1340. 1957.
During the symposium, a number of reports on control of eelworms were presented. It was reported that even an efficient nematocide such as DD may give results that vary from place to place depending upon the nature of the soil. The main factor appears to be the water content. This report was in reference to the potato root eelworm. With regard to anguilluline eelworms in nursery stock, flower crops and carrots, DD was the most reliable nematocide. Ethylene dibromide was very effective against root knot eelworm under glass. It was noted that the use of sodium methyl dithiocarbamate appeared to be very promising.

306. MILLER, P. R. (Compiler). Plant disease situation in the United States: summer dwarf nematode disease of strawberry in Arkansas. F.A.O. Pl. Prot. Bull. 5: 174-175. 1957.

307. MINTON, NORMAN A. and ELDON J. CAIRNS. Suitability of soybeans var. Ogden and twelve other plants as hosts of the spiral nematode. (Abstr.) Phytopathology 47: 313. 1957.
Helicotylenchus nannus was found to multiply on the roots of soybean plants in addition to 12 other kinds of plants. In the case of soybean, the effects of the nematode included reduction in root weight.

308. MINZ, G. Free living plant parasitic and possible plant-parasitic nematodes in Israel. Plant Dis. Reptr. 41: 92-94. 1957.
This paper covers 22 genera of nematodes derived from 44 plant species and surrounding soil obtained from localities scattered throughout the country. In addition a number of non-parasitic nematodes are also listed at the end of the paper.

309. MIUGE, S. G. (On the physiological specificity of the bulb nematode Ditylenchus allii Beij.) (Russian) Zool. Zhur. 36: 620-622. 1957.

310. MOUNTAIN, W. B. and H. R. BOYCE. Parasitic nematodes in relation to the peach replant problem in Ontario. (Abstr.) Phytopathology 47: 313. 1957.
Pratylenchus penetrans appears to be the only nematode which can be correlated with the occurrence of the problem. Soil fumigation with D-D was effective and gave almost complete control of the nematode for at least 2 years. Commercial peach nurseries are infested with P. penetrans.

311. MULVEY, R. H. Susceptibilities of cultivated and weed plants to the sugar-beet nematode, Heterodera schachtii Schmidt, 1871, in southwestern Ontario. J. Helminth. 31: 225-228. 1957.
Included in the test were 90 plants involving 18 families. It was found that some plants withstood the attack of the nematodes better than others. Cabbage, turnip, broccoli, cauliflower and Brussels sprouts, although heavily attacked, showed good growth. Mangel, red beet, rutabaga, sugar beet and leaf beet (Swiss chard) showed progressively poorer growth each year.

312. NOLTE, H. W. and A. DIETER. Nematoden an Baumschulgewächsen in Mitteldeutschland. Nematologica 2: 63-67. 1957.
An investigation of nematodes associated with decline of nursery stock including Robinia, Caragana, Prunus, Laburnum, Sambucus, Rosa, Syringa, Larix, Pinus, Picea is reported. Parasitic nematodes in the families Tylenchidae and Dorylaimidae were encountered.

313. NORTON, DON C. Radopholus gracilis in a dry subhumid environment. Plant Dis. Reptr. 41: 599. 1957.

Radopholus gracilis has been reported to occur in extremely moist places and most of the plants with which the nematode has been associated are hydrophytes. In September 1956, R. gracilis was found associated with the roots of Virginia wild rye (Elymus virginicus var. glabriflorus) growing in a clay loam upland slope in the rolling plains of Archer County, Texas. The present finding is in a distinctly more xeric habitat than previously reported.

314. ONIONS, T. G. Emergence of larvae from sealed cysts of the potato root eelworm, H. rostochiensis Wollenweber. Nature 179: 323-324. 1957.

It has been shown previously that hatching of eggs contained in the cysts is not random; eggs near the cyst wall tend to hatch sooner than eggs nearer the center of the mass. It also appeared that the position of eggs in relation to either of the two natural openings, the neck and vulva, was without influence on the hatching distribution. This report confirms this conclusion, for it is now shown that sealing either of the openings has no detectable effect on the distribution. Moreover emergence from cysts with only one effective opening appears to take place as rapidly as from normal cysts.

315. OOSTENBRINK, M. Nematoden in Verband met de Vruchtbaarheid van de Grond. Openbare les Uitgesproken bij Openlijke aan Vaarding van het Lectoraat in de Nematologie aan de Landbouwhoogeschool te Wageningen op 28 Maart 1957.

316. OTEIFA, BAKER A. and DAWOOD M. EL-GINDI. Effect of irrigation frequency and size of tomato seedlings on root knot index. Plant Dis. Reptr. 41: 605-607. 1957.

The effect of irrigation frequency and size of tomato seedlings on root knot (Meloidogyne sp.) index were determined under field conditions in Egypt. Heavy irrigation increased the amount of nematode injury. The effect of seedling size did not significantly affect root knot.

317. PARRIS, G. K. Screening Mississippi soils for plant parasitic nematodes. Plant Dis. Reptr. 41: 705-706. 1957.

The cause of decline of turf grass, ornamentals, cotton, and pecan in Mississippi is demonstrated to be often due to attack by plant endo- and ectoparasitic nematodes, including species of the genera Tylenchorhynchus, Trichodorus, Rotylenchus, Criconemoides, Hoplolaimus, Xiphinema, Paratylenchus, and Pratylenchus.

318. PEA ROOT EELWORM. Gt. Brit. Min. Agr. Fisheries and Food Adv. L. 462. 1957. Heterodera göttingiana.

319. PEACOCK, F. C. Plant parasitic eelworms. Outlook on Agriculture 1: 188-196. 1957.

A general discussion of nematodes in relation to plants. The study of eelworms has rapidly become an important branch of plant pathology. Many species are now known to be serious parasites of cultivated plants in tropical as well as temperate lands, and our knowledge of eelworm biology has steadily advanced. However, attempts at control by breeding resistant plants or by chemical or other measures have met with limited success, and a practical answer to the problem has yet to be found.

320. PEACOCK, F. C. Studies on root knot nematodes of the genus Meloidogyne in the Gold Coast. Part II. The effect of soil moisture content on survival of the organism. Nematologica 2: 114-122. 1957.

In laboratory and greenhouse experiments, root knot larvae and egg masses were shown to be highly susceptible to death by desiccation. Egg masses were also somewhat intolerant of excess moisture. Where

nematodes were protected by plant material both these extremes had less effect. The initial moisture content for survival appeared to be 3 to 4 percent (10 to 13 percent of saturation).

321. PETERS, B. G. Plant parasitic nematodes. Nature 179: 902-903. 1957.
In a symposium held by the Linnean Society, various types of association between plants and nematodes were discussed. Population studies on cyst-forming nematodes, resistance in potato to the potato root nematode, and the interrelation of the leaf nematode Aphelenchoides ritzemabosi and the bacterium Corynebacterium fascians in producing cauliflower disease were also discussed.

322. RANKIN, H. W. The influence of nematodes on the wilt infection of okra. Assoc. South Agr. Workers Proc. 54: 223. 1957.
Ten selections of okra, when subjected to growth conditions including checks and all combinations of two species of nematodes and Fusarium vasinfectum reacted as follows: Out of a possible stand of 300 plants the various treatments gave the final following results -- checks, 265 plants; Fusarium vasinfectum alone, 255 plants; Pratylenchus leiocephalus alone, 247 plants; P. leiocephalus plus F. vasinfectum, 193 plants; Meloidogyne incognita acrita, 73 plants; M. incognita acrita plus F. vasinfectum, 52 plants.

323. RASKI, D. J. New host records for Meloidogyne hapla including two plants native to California. Plant Dis. Reptr. 41: 770-771. 1957.
The host range of Meloidogyne hapla is extended by the addition of bush germander, Teucrium fructicans; California laurel, Umbellularia californica; and salt rush, Juncus leseurii. The last two plants are native to California and their locations suggest that M. hapla may also be native to this State.

324. RICHARDS, C. D., E. S. PLISSEY and M. T. HILBORN. Occurrence of plant parasitic nematodes in Maine. Plant Dis. Reptr. 41: 1019-1020. 1957.
Five hundred twenty-two soil samples from commercially important crops were examined. Plant parasitic nematodes were found in 41 samples. Pratylenchus, Paratylenchus, Meloidogyne, and Aphelenchoides are reported.

325. RILEY, R. and V. CHAPMAN. Chromosomes of the potato root eelworm. Nature 180: 662. 1957.
Preliminary examination shows that Heterodera rostochiensis is cytologically distinct from an unidentified species of Heterodera and from a species of a related genus, Meloidogyne incognita, both of which have been reported to have 16 chromosomes.

326. RHODE, R. A. and W. R. JENKINS. Host range of a species of Trichodorus and its host-parasite relationships on tomato. Phytopathology 47: 295-298. 1957.
Damage to roots is caused by decreased cell multiplication rather than by mechanical destruction of cells.

327. SAUER, M. R. and J. E. GILES. Effects of some field management systems on root knot of tomato. Nematologica 2: 97-107. 1957.
The effects of four systems of field management on Meloidogyne javanica were studied over three seasons. Growing of susceptible tomatoes in the same soil for several years gave uniform severe infestation. Growing of nematode-resistant tomatoes gave good yields but did not reduce the nematode population sufficiently for susceptible crops. Clean fallow for 3 years reduced the infestation significantly. Summer fallow with a winter cover crop of barley gave the same results as clean fallow.

328. SCHINDLER, A. F. Parasitism and pathogenicity of Xiphinema diversicaudatum, an ectoparasitic nematode. Nematologica 2: 25-31. 1957.

The author concludes that the nematode is a plant parasite and is pathogenic in that it causes abnormal galling of root tissues and inhibits growth. It is concluded that Xiphinema diversicaudatum is a serious problem in greenhouse rose production. Another factor, either biological or chemical, is also responsible for some stunting similar in effect to the lower concentrations of Xiphinema used in the experiments.

329. SCHINDLER, A. F. and A. J. BRAUN. Pathogenicity of an ectoparasitic nematode, Xiphinema diversicaudatum, on strawberries. Nematologica 2: 91-93. 1957.

The authors conclude that this nematode is a pathogen of strawberries and when present in sufficient numbers may seriously inhibit their growth.

330. SHANDS, W. A. Jr. and H. W. CRITTENDEN. The influence of nitrogen and potassium on the relationship of Meloidogyne incognita acrita and soybeans. (Abstr.) Phytopathology 47: 454: 1957.

Nitrogen and potassium influenced the relationship of the nematode and soybeans. There was a general increase in penetration of Anderson (resistant variety) and in the amount of galls on Adams (susceptible) and Wabash (moderately susceptible),with an increase of both nitrogen and potassium.

331. SHER, S. A. A disease of roses caused by a root-lesion nematode, Pratylenchus vulnus. Phytopathology 47: 703-706. 1957.

A disease of roses demonstrated to be caused by the root-lesion nematode, Pratylenchus vulnus Allen & Jensen, is characterized by stunted chlorotic plants with necrotic root systems that are smaller than normal. Root-lesion nematode disease was reproduced in rose cuttings grown in field soil in the greenhouse, and it was eliminated by fumigation of the soil prior to planting. Artificial infestation of soil with P. vulnus caused the disease. Leaves from infested plants were lower in iron, copper, and potassium than were control plant leaves.

332. SKOTLAND, C. B. Biological studies on the soybean cyst nematode. Phytopathology 47: 623-625. 1957.

It is suggested that four to five generations of Heterodera glycines could develop in North Carolina in one growing season. Viability of eggs and larvae in cysts is drastically reduced by desiccation.

333. SLACK, D. A. et al. Summer dwarf of strawberry. Plant Dis. Reptr. 41: 398-401. 1957.

Recent occurrences of summer dwarf (Aphelenchoides besseyi) were recorded in strawberry plantings. Aberrant symptoms of the disease were observed on plants in the field and greenhouse. Field development was most striking during late fall rather than in midsummer.

334. SOUTHEY, J. F. Observations on Heterodera cacti Filipjev et Sch. Stekhoven and Meloidogyne spp. on imported cactus plants with a list of new host records. Nematologica 2: 1-6. 1957.

A complete list of recorded hosts is given. Species of Meloidogyne found included M. incognita, M. incognita var. acrita, and M. arenaria. The morphology of Heterodera cacti is considered. It is thought that these nematodes should be regarded as important pests of cactus plants because of the damage they do to the roots. Control suggestions are given.

335. SOUTHEY, J. F. Observations on races of Ditylenchus dipsaci infesting bulbs. J. Helmin. 31: 39-46. 1957.

The author tested the host range of three strains of this nematode (tulip race, narcissus race, and hyacinth race). The results are discussed, particularly in interpreting the characteristics of a true host.

336. SPEARS, J. F., S. C. BALCOMBE and G. HEMERICK. Detection of Heterodera glycines in North Carolina. (Abstr.) Phytopathology 47: 33. 1957.

Symptoms of soybean cyst nematode disease were visible on snap-bean and soybean foliage 6 weeks after planting where cyst count prior to planting was from 5 to 200 cysts per pound of soil; at 1 cyst per pound, symptoms 12 weeks after planting; at 1 cyst in 10 pounds, no symptoms. Under favorable conditions for growth symptoms included stunting and yellowing with chlorosis beginning distally on the foliage. Roots of diseased plants were small, dark, odorless, with few or no nodules, and cysts were plainly visible on such roots.

337. STANILAND, L. N. The swarming of rhabditid eelworms in mushroom houses. Plant Path. 6: 61-62. 1957.

A phenomenon, which is perhaps best described as swarming, has been observed on several occasions recently in mushroom houses in Dorset. Vast numbers of rhabditid eelworms (Rhabditis sp.) have been observed on the surface of the peat casing, the nematodes being grouped into club-like masses containing up to 100 individuals. Grouped thus they are easily seen with the naked eye. The eelworms most frequently swarm near doors or electric lights. The masses were found to react very strongly to tactile stimuli.

338. STEM AND BULB EELWORM ON NARCISSI, HYACINTHS, AND RELATED BULBS. Gt. Brit. Min. Agr. Fisheries and Food Adv. L. 460. 1957.

A general advisory leaflet containing a description and life history of Ditylenchus dipsaci, a discussion of the narcissus race and the hyacinth race, examples of weed hosts, means of spread and control measures.

339. A STUDY OF THE INCIDENCE OF NEMATODES IN SUGAR BEET PRODUCTION. Sugar Beet Development Foundation, Fort Collins, Colorado. 1957.

Samples of soil and of sugar beets were collected from 35 counties in the States of California, Colorado, and Michigan. Twenty-two genera and species of plant parasitic nematodes were found parasitic on or associated with sugar beet crops. Five species of nematodes were found directly parasitizing sugar beet roots (Heterodera schachtii, Meloidogyne incognita acrita, M. hapla, M. javanica, and Nacobbus batatiformis).

340. TARJAN, A. C. Observations on Ecphyadophora tenuissima de Man, 1921. Nematologica 2: 152-158. 1957.

Nineteen females and five males from five locations in Florida and from Ruurlo, Holland, have been studied. The nematodes were obtained from soil and roots of Valencia orange on rough lemon, pasture grass roots, sugar cane roots and soil, tomato soil, and Juniperus silicicola roots and soil.

341. TAYLOR, D. P. Plant parasitic nematodes. Minn. Farm & Home Sci. 14 (3): 5, 9. 1957.

A preliminary survey of Minnesota crops showed 19 genera and 40 species of plant parasitic nematodes to be present.

342. THOMAS, H. ALLEN. Some initial findings on nematodes on peaches in New Jersey. Plant Dis. Reptr. 41: 526. 1957.

Samples were made from 19 orchards, many of them old or declining. The list shows the nematode genera found and the number of orchards in which they occurred: Pratylenchus, 11; Xiphinema, 11; Ditylenchus, 4; Longidorus, 2; Tylenchorhynchus, 2; Criconemoides, 2; Aphelenchus, 2; Tylenchus, 1; Hoplolaimus, 1.

343. THOMASON, IVAN J. Influence of soil temperature on reproduction of Meloidogyne spp. (Abstr.) Phytopathology 47: 34-35. 1957.

Three species of Meloidogyne were tested, M. hapla, M. incognita acrita, and M. javanica. All species reproduced at 20°, 25° and 20° C. Reproduction of M. hapla at 35° was extremely limited and inconsistent. Populations of M. incognita acrita and M. javanica were reduced markedly at 35° although one population of M. javanica did reproduce well at this temperature.

344. THOMASON, IVAN J. and S. A. SHER. Influence of the stubby root nematode on growth of alfalfa. Phytopathology 47: 159-161. 1957.

Alfalfa plants were severely stunted when grown in the greenhouse in soil infested with the stubby root nematode, Trichodorus sp. Dry weight of plants grown in infested soil was significantly reduced. Lateral root development also was reduced. Soil fungi present in stunted alfalfa roots from Trichodorus-infested soil did not cause reduction in growth of alfalfa.

345. THORNE, G. Plant parasitic nematodes in soil biology. Proc. Soil Sci. Soc. Am. 1957, 21: 1-2. 1957.

A general discussion in which the author discusses the effect of nematodes upon early American agriculture, the damage nematodes are causing today, the effect nematodes may have on the experimental results of other workers, and control through soil fumigation.

346. THORNE, G. W. Nematodes. What's New in Crops and Soils 9 (7): 11-13. 1957.

347. VAN GUNDY, S. D. The first report of a species of Hemicycliophora attacking citrus roots. Plant Dis. Reptr. 41: 1016-1018. 1957.

Hemicycliophora sp. an ectoparasitic nematode, was found parasitizing Rough lemon roots in the Coachella Valley of Southern California. The nematodes were associated with distinctive galls at the distal portion of the terminal and lateral roots.

348. VAN WEERDT, L. G. Studies on the biology of Radopholus similis (Cobb) 1893, Thorne 1949. Part I. Plant Dis. Reptr. 41: 832-835. 1957.

Inoculations of Rough lemon seedlings with burrowing nematodes from boxwood, calathea, ginger lily, banana, pothos, and citrus were for the most part unsuccessful; whereas inoculations of boxwood, calathea, ginger lily, banana, and pothos with burrowing nematodes obtained from these hosts and citrus were successful. Other evidence is also presented to show that cross-inoculations are not always successful, which suggests the existence of races. Citrus is a relatively poor host for the burrowing nematode in terms of population build-up.

349. VIGLIERCHIO, D. R. and B. F. LOWNSBERY. Effect of tomato seedlings on larvae of Meloidogyne hapla. (Abstr.) Phytopathology 47: 536-537. 1957.

An increase in the rate of larval emergence takes place from egg masses of Meloidogyne hapla exposed to excretions of radicles of germinating seeds of Rutgers tomato in sand or water. This hatching stimulus is much less pronounced than that induced by the hosts of some of the species of Heterodera, but it is statistically significant and evident within 24 hours. The apparent directional movement of larvae of Meloidogyne, as noted previously, may well be a reaction to a chemotactic agent emanating from the roots of tomato seedlings.

350. WALLACE, H. R. The stimulatory properties of some organic substances on cysts of the beet eelworm, Heterodera schachtii Schmidt. Ann. Appl. Biol. 45: 251-255. 1957.

There was no significant difference between the rates of larval emergence in glutamic acid, galactinol, inositol and water; the rate of larval emergence in beet diffusate, on the other hand, was significantly higher. Studies of larval emergence in carbohydrates suggest that the cyst population used in the experiments was heterogeneous, consisting

of two types of cyst that have different reactions to stimulation at different concentrations. The significance of root exudates in relation to beet eelworm is discussed.

351. WEISCHER, B. Die Wirkung ionisierender Strahlen auf die Entwicklung von Heterodera rostochiensis und H. schachtii. Nematologica 2: 300-305. 1957.

Cysts of the potato root eelworm and the beet eelworm were irradiated by radium for different times up to 196 hours. The radiation dose was 400 r/h (r = Roentgen). Compared with data for other animals in the literature, the nematodes showed a remarkable resistance to the rays. Treatment of less than 72 hours had no apparent effect. After longer exposure, the hatching of larvae from the cysts of the beet eelworm was reduced, whereas in the potato root eelworm many more larvae hatched from the irradiated cysts. The development of larvae from both species was retarded and rate of reproduction reduced.

352. WHITLOCK, LEIGH S. The burrowing nematode found on ornamental banana plants at Baton Rouge, Louisiana. Plant Dis. Reptr. 41: 814. 1957.

This nematode has previously been reported from Louisiana, from sugar cane roots and from Pothos and Philodendron in two ornamental nurseries.

353. WILLIAMS, T. D. Development of isolated female larvae of the potato-root eelworm (Heterodera rostochiensis Woll.). Nature 180: 1000. 1957.

The experiment was undertaken to determine whether Heterodera rostochiensis could reproduce in the absence of males (i. e. parthenogenesis or syngonism). One hundred single-larva inoculations were set up. In two instances, single developing females were seen. These cysts did not pass through the distinctive yellow stage and no eggs were found when the cysts were opened. These results agree with those of other workers, to the effect that parthenogenesis does not occur.

354. WILSON, J. D. A distribution pattern of root-knot nematode infestation on muck-grown carrots. Down to Earth 13 (1): 4-7. 1957.

The author found that the degree of root-knot nematode infestation can vary widely within the same field, which suggests the need for replicating nematode control studies. Plots for fertilizer, insecticide, fungicide, and weed killer studies should be relatively nematode-free for best results, since these pests may seriously affect yield and plant growth. Sequence of crops on land has an effect on nematode populations and rotations may offer a supplement to chemical control practices.

355. WINNER, CHRISTIAN. Über die aktivierende Wirkung von Aminoacridinen auf Heterodera schachtii. Nematologica 2: 126-130. 1957.

Some amino-acridines were investigated for their hatching activity on eggs of Heterodera schachtii. Stimulation of Heterodera larvae within the cysts by some of the substances tested cannot be explained by the surface activity or redox-potentials of the compounds. The stimulating effect is not restricted to 9-amino-acridines. Results are discussed with regard to the possible mechanism of activation by chemical stimulus.

356. WINSLOW, R. D. and T. D. WILLIAMS. Amoeboid organisms attacking larvae of the potato root eelworm (Heterodera rostochiensis Woll.) in England and the beet eelworm (H. schachtii Schm.) in Canada. T. Pl. Ziekten 63: 242-243. 1957.

Amoeboid organisms have been found attacking Heterodera rostochiensis in England and H. schachtii in Canada. In both cases the attacks occurred under laboratory conditions on larvae emerging from cysts in water or in root leachate in glass containers. The organisms appear to be very similar to the nematode-hatching organism Theratromysea weberi (Zwillinberg 1953). In the specimens described in the present paper some differences are observed from the behaviour of T. weberi.

357. WINSLOW, R. D. and R. A. LUDWIG. Studies on hatching stimulation in the beet nematode, Heterodera schachtii Schmidt. Can. J. Bot. 35: 619-634. 1957.

Sugar beets produced more active leachate under "short" day and moderate temperatures than under long day and more extreme temperatures. Stimulatory leachates were produced from various parts such as tops alone, roots alone, and various portions of the root of young rape seedlings. Sugar beet leachate was concentrated 20- to 40-fold, by vacuum distillation, without obvious loss of activity, frequently with apparent gain. Further concentration caused precipitation of active material.

358. WINSTEAD, N. N. and C. B. SKOTLAND. Eradicant treatments for narcissus bulbs and gladiolus corms harboring soybean nematode cysts. Phytopathology 47: 65-69. 1957.

The customary hot water and formaldehyde treatments for controlling bulb and stem nematodes of narcissus and gladiolus also controlled Heterodera glycines. Soaking gladiolus corms for 15 minutes in a solution of Na 2:4:5-trichlorophenate (85%) containing 3 pounds per 100 gallons was also effective.

359. WOOD, F. C. and J. B. GOODEY. Effects of gamma-ray irradiation on nematodes infesting cultivated mushroom beds. Nature 180: 760-761. 1957.

The irradiation dose necessary to inactivate the reproduction of Ditylenchus destructor and a species of Rhabditis appears to lie between 48,000 and 96,000 rep, more than twice as great as the 10,000 and 20,000 r. other workers found to inactivate cysts of the potato root nematode.

360. ZINOV'EV, V. G. (Enzymatic activity of the nematodes parasitizing plants.) In Russian. Zool. Zhur. 36: 617-620. 1957.

Nematodes -- Resistance

361. BARHAM, W. S., and N. N. WINSTEAD. Inheritance of resistance to root-knot nematodes in tomatoes. Am. Soc. Hort. Sci. Proc. 69: 372-377. 1957.

362. BINGEFORS, S. Studies on breeding red clover for resistance to stem nematodes. Sweden. Lantbrhögsk. Inst. f. Växtodlingslara. Vaxtodling. 8, 123 pp. 1957.

363. DIJKSTRA, J. Symptoms of susceptibility and resistance in seedlings of red clover attacked by the stem eelworm Ditylenchus dipsaci (Kühn) Filipjev. Nematologica 2: 228-237. 1957.

In this paper the results of a detailed study of symptoms associated with resistance and susceptibility in red clover are considered. When susceptible seedlings are inoculated, symptoms include abnormal swelling at the growing point, at the base of the cotyledon stalks, and at the top of the hypocotyl. Inoculated resistant plants showed no swellings, but brown stripes and some distortion. It was shown that multiplication of eelworms occurs only in the swollen (i.e. susceptible) plants.

364. DROLSOM, P. N., E. L. MOORE and E. E. CLAYTON. Resistance to two Meloidogyne species in breeding lines of flue-cured tobacco. (Abstr.) Phytopathology 47: 312. 1957.

Results to date from greenhouse studies indicate high resistance to Meloidogyne incognita and to M. incognita acrita, and susceptibility to M. arenaria. Results were inconclusive with respect to M. hapla and M. javanica.

365. FORD, H. W. Citrus rootstock selections tolerant to the burrowing nematode. Florida St. Hort. Soc. Proc. 69: 44-51. 1957.

366. GRIFFITHS, D. J., J. H. W. HOLDEN and J. M. JONES. Investigations on resistance of oats to stem eelworm, Ditylenchus dipsaci Kühn. Ann. Appl. Biol. 45: 709-720. 1957.

A study of some 250 forms of oats revealed new sources of resistance in cultivated and wild species. New sources of resistance in the cultivated species of Avena sativa were found only in winter types, and in the other hexaploid species in forms belonging to A. byzantina and the winter wild oat A. ludoviciana. The inheritance of reaction to stem eelworm in crosses involving Grey Winter and susceptible types depended on a single factor pair with resistance dominant.

367. HARE, W. W. Inheritance of resistance to root-knot nematodes in pepper. Phytopathology 47: 455-459. 1957.

Resistance to two species of Meloidogyne is controlled by a single dominant gene.

368. HUTTON, E. M. and L. B. BEALL. Root-knot nematode resistance in two pasture species of Phaseolus. J. Aust. Inst. Agr. Sci. 23: 158. 1957.

369. JONES, F. G. W. Resistance-breaking biotypes of the potato root eelworm (Heterodera rostochiensis Woll.). Nematologica 2: 185-192. 1957.

This paper reports tests carried out to confirm the occurrence of biotypes of the potato root eelworm capable of producing numerous cysts upon resistant clones of Solanum tuberosum subsp. andigena and upon resistant seedlings bred from crosses of these clones with varieties of S. tuberosum subsp. tuberosum.

370. NELSON, R. R. Resistance in corn to Meloidogyne incognita. (Abstr.) Phytopathology 47: 25-26. 1957.

Corn inbreds and single crosses were tested for their reaction to the root-knot nematode Meloidogyne incognita. Certain inbreds appeared to have some resistance, others were highly susceptible (based on production of galls) whereas still other inbreds appeared to possess tolerance since heavy galling was combined with no loss in root weight.

371. PEACOCK, F. C. Studies on root-knot nematodes of the genus Meloidogyne in the Gold Coast. Part I. Comparative development on susceptible and resistant host species. Nematologica 2: 76-84. 1957.

The development of the root-knot nematode on a number of hosts in the Gold Coast was studied and the host/parasite relationship compared. The life-cycle of the most advanced individuals on tomato and cowpea is 28 days, at soil temperatures of 26° to 31° C; on maize, soya, and tobacco the life cycle occupied 33 days but individual variation was considerable.

372. ROSS, J. P. and C. A. BRIM. Resistance of soybeans to the soybean cyst nematode as determined by a double row method. Plant Dis. Reptr. 41: 923-924. 1957.

During the spring of 1957, approximately 2800 selections and varieties of soybean were evaluated for resistance by means of a double row planting method. The results of the test indicate that resistance to the soybean cyst nematode is available within present soybean germ plasm. There is evidence that biological races within Heterodera glycines exist since resistant soybean varieties developed in Japan were found to be susceptible when planted in North Carolina.

373. SHARPE, R. H. Okinawa peach resists root knot nematodes. Sunshine St. Agr. Res. Rept. 2 (1): 18. 1957.

374. SHEPHERD, A. M. Development of beet eelworm, Heterodera schachtii Schmidt, in the wild beet, Beta patellaris. Nature 180: 341. 1957.

It was suggested previously that, while the roots of the resistant species of wild beet, Beta patellaris, are invaded by larvae of the beet eelworm, Heterodera schachtii, no further development occurs beyond an early larval stage. It has now been found that not only does a large proportion of the larvae which enter the roots of B. patellaris develop to the intermediate

or third larval stage, but also that a small percentage develop to maturity, becoming males.

375. TANAKA, I. (Resistance of tobacco seedlings to root-knot nematodes.) In Japanese. Kyushu. Agr. Res. 1957: 67-68. 1957.

376. THOMASON, IVAN J. and PAUL G. SMITH. Resistance in tomato to Meloidogyne javanica and M. incognita acrita. Plant Dis. Reptr. 41: 180-181. 1957.
A tomato line (HES 4857) derived from a cross of Lycopersicon esculentum x L. peruvianum was found to be highly resistant to the root knot nematode, Meloidogyne incognita acrita. Resistance is governed by a single dominant gene. An F_3 line (54N6) from a backcross of HES 4857 x commercial tomato was resistant to M. javanica and M. incognita acrita.

Nematodes -- Taxonomy

377. ALLEN, M. W. A review of the nematode genus Trichodorus with descriptions of ten new species. Nematologica 2: 32-62. 1957.
Trichodorus primitivus (de Man 1880) is redescribed and ten new species of Trichodorus are described, including the species first reported to cause stubby root disease in Florida.

378. ANDRASSY, I. Aphelenchoides citri n. sp., ein neuer Wurzelparasit der Zitrone. Nematologica 2: 238-241. 1957.
The species is reported on the roots of a young lemon tree. Tails very long and filiform, males unknown.

379. ANDRASSY, I. Deladenus aridus n. sp. und ein Wiederfund von Deladenus saccatus Andrassy, 1954. Nematologische Notizen 5. Opuscula Zoologica 2: 3-8. 1957.
The paper contains a description of Deladenus aridus together with an emended description of D. saccatus and a key to the species of this genus.

380. ANDRASSY, I. Thornia gubernaculifera n. sp., ein neuer Susswassernematode aus Ungarn. Nematologische Notizen 6. Opuscula Zoologica 2: 9-14. 1957.
The new species is a fresh water form.

381. CHITWOOD, B. G. and W. BIRCHFIELD. A new genus, Hemicriconemoides (Criconematidae:Tylenchina). Proc. Helminth. Soc. Wash. 24: 80-86. 1957.
Hemicriconemoides wessoni on roots of Myrica cerifera; H. biformis on roots of Quercus virginiana; H. floridensis on roots of Pinus elliotti and Ilex glabra.

382. CHITWOOD, B. G. A new species of Xiphinemella Loos, 1950, (Nematoda) from Florida. Proc. Helminth. Soc. Wash. 24: 53-56. 1957.
Found around roots of Spanish oak, red maple, and the fern Pteris aquilina var. latiuscula.

383. CHITWOOD, B. G. Two new species of the genus Criconema Hofmänner and Menzel, 1914. Proc. Helminth. Soc. Wash. 24: 57-61. 1957.
Criconema decalineatum on fig roots; C. spinalineatum on Manila grass roots.

384. CHITWOOD, B. G. and A. C. TARJAN. A redescription of Atylenchus decalineatus Cobb, 1913 (Nematoda:Tylenchinae). Proc. Helminth. Soc. Wash. 24: 48-52. 1957.
Obtained from roots of cranberry, native persimmon, sugarcane, and a citrus grove.

385. FRANKLIN, MARY T. Aphelenchoides composticola n. sp. and A. saprophilus n. sp. from mushroom compost and rotting plant tissues. Nematologica 2: 306-313. 1957.
The two species of Aphelenchoides herein described as new have been shown to have clear morphological differences. A. composticola is also

clearly distinguishable from A. parietinus by its greater length, smaller relative width, and the number of lines on the lateral field. A. saprophilus is extremely close to A. parietinus. There are differences in the shape and curvature of the female tail, the relative length of egg, and the absence of males in A. parietinus.

386. GOODEY, J. B. Hoplolaimus proporicus n. sp. (Hoplolaiminae:Tylenchida). Nematologica 2: 108-113. 1957.

New species recovered from decayed roots of seedlings of the oil palm (Elaeis guineensis) suffering from the disease known as "blast".

387. LORDELLO, LUIZ GONZAGA E. Two new nematodes found associated with soybean roots. Nematologica 2: 19-24. 1957.

Carcholaimus formosus n. sp.; Dorylaimus bauruensis n. sp.; in Brazil.

388. LUC, MICHEL. Radopholus lavabri n. sp. (Nematoda, Tylenchidae) parasite du riz au Cameroun français. Nematologica 2: 144-148. 1957.

This new species was found on the roots of rice plants in the French Cameroons (West Africa). A description with illustrations is given of the new species.

389. LUC, M. Tylenchulus mangenoti n. sp. (Nematoda - Tylenchulidae). Nematologica 2: 329-334. 1957.

The description of Tylenchulus mangenoti n. sp. confirms the opinion of Raski (1957) as to the close relations between the genera Tylenchulus and Trophotylenchulus. The presence of a functional anus is noted in the females of Tylenchulus mangenoti and the author suggests that the anus and the posterior part of the alimentary canal, though difficult to perceive in the females of other Tylenchulidae, may nevertheless be functional.

390. MULVEY, ROLAND H. Taxonomic value of the cone top and the underbridge in the cyst-forming nematodes Heterodera schachtii, H. schachtii var. trifolii, and H. avenae (Nematoda:Heteroderidae). Can. J. Zool. 35: 421-423. 1957.

Distinct morphological differences in the cone top and underbridge of the cysts seem to separate Heterodera schachtii, H. schachtii var. trifolii, and H. avenae.

391. PAESLER, F. Beschreibung einiger Nematoden aus Champignonbeeten. Nematologica 2: 314-328. 1957.

A new subgenus, four new species of nematodes and a new variation of the superfamilies Rhabditoidea, Tylenchoidea, and Aphelenchoidea are described. Because it is new for Germany Deladenus obesus Thorne is redescribed. In a comparison of Ditylenchus destructor from potatoes and Ditylenchus sp. from mushrooms, the existing morphological differences are demonstrated.

392. RASKI, D. J. Trophotylenchulus and Trophonema, two new genera of Tylenchulidae N. Fam. (Nematoda). Nematologica 2: 85-90. 1957.

The description of two new genera: Trophonema in the subfamily Sphaeronematinae, but differing from Sphaeronema primarily in the shape of the females; and Trophotylenchulus in the subfamily Tylenchulinae. The type species are Trophonema arenarium (Raski, 1956) n. comb. (synonym Sphaeronema arenarium Raski, 1956) and Trophotylenchulus floridensis n. sp.

393. SANWAL, K. C. The morphology of the nematode Radopholus gracilis (De Man, 1880) Hirschmann, 1955, parasitic in roots of wild rice, Zizania aquatica L. Can. J. Zool. 35: 76-92. 1957.

The anatomy of the nematode is described, the description being based chiefly on the study of living specimens and intravital staining with methylene blue and neutral red. The nematodes appear to be adapted to an

aquatic environment and seem to be unaffected by low temperatures and low oxygen content in their habitat.

394. TAYLOR, D. P. and W. R. JENKINS. Variation within the nematode genus Pratylenchus, with the descriptions of P. hexincisus, n. sp. and P. subpenetrans, n. sp. Nematologica 2: 159-174. 1957.

Pratylenchus hexincisus was recovered from the roots of corn. It possesses six incisures in the lateral field and one striation on the lip region. P. subpenetrans was recovered from the roots of pasture grasses. P. subpenetrans most closely resembles P. penetrans but can be separated mainly on its smaller size, longer post-uterine branch, and vestigial ovary tissue posterior to the vulva.

Nematodes -- Technique

395. DARLING, H. M., L. R. FAULKNER and P. WALLENDAL. Culturing the potato rot nematode. (Abstr.) Phytopathology 47: 7. 1957.

Large, pure populations of the potato rot nematode have been obtained in two ways. A modified White's nutrient agar medium was used to culture host tissue, upon which the nematode developed. Populations were also raised in cultures of 37 species of 15 genera of fungi. Individual cultures have been kept this way since 1954.

396. DROPKIN, VICTOR H. A method for determination of the infectivity of Heterodera rostochiensis larvae. Nematologica 2: 72-75. 1957.

A bioassay system for the measurement of the ability of nematode larvae to enter plant roots is likely to be useful in many ways. A simple procedure in which larval entry is complete within 48 hours is described. Exposures to single larvae yield results comparable to exposures to groups of 25 larvae. Infectivity declines as larvae are stored in water. No correlation between motility and infectivity of stored larvae was found.

397. ELLENBY, C. and A. B. GILBERT. Cardiotonic activity of the potato-root eelworm hatching factor. Nature 180: 1105-1106. 1957.

398. ESSER, R. P. An improved post Baermann funnel technique. Plant Dis. Reptr. 41: 269-270. 1957.

Water is drawn from the Baermann funnel into the centrifuge tube and allowed to sediment for 15 to 20 minutes. The tube is placed under a dissecting microscope, nematodes are drawn from bottom of the tube with a pipette and discharged onto a slide and examined directly, or a 22 x 40 cover slip is added and sealed. Excess water under the clover slip should be evaporated before sealing.

399. FORD, H. W. A source of controlled vacuum for pipetting nematodes. Plant Dis. Reptr. 41: 89-90. 1957.

The apparatus described applies a constant controllable suction while the tip of the pipette is under water.

400. JOHNSON, R. P. C. An improved cyst counting tray. Plant Path. 6: 75. 1957.

An improvement on the Fenwick counting tray, made out of 1/4-inch white Perspex.

401. KIRKPATRICK, J. D. and W. F. MAI. A new staining technique for in situ observation of Pratylenchus penetrans and other endoparasitic nematodes. (Abstr.) Phytopathology 47: 526. 1957.

A method has been developed whereby various stages of endoparasitic nematodes can be clearly differentiated from root and other host tissues. A procedure is outlined whereby the nematodes and eggs are seen to be deep blue to green in colorless tissue. The colors will fade, but can be reconstituted by immersion in the dye.

402. MILLER, PATRICK M. Cheap disposable filters for nematode surveys. Plant Dis. Reptr. 41: 192. 1957.

Filters are simply constructed of 5-ounce paper cups and Scottie paper facial tissues. The bottom is cut out of the cup leaving the rim for strength. The Scottie is made up into a filter pad, pressed over the bottom of the cup and fastened in place by a rubber band. This eliminates the cumbersome and time-consuming use of Baermann funnels.

403. MILLER, PATRICK M. A method for the quick separation of nematodes from soil samples. Plant Dis. Reptr. 41: 194. 1957.

A modification of the Caveness-Jensen centrifugal flotation method whereby the supernatant liquid is filtered through a 325-mesh screen instead of allowing the nematodes to settle.

404. MURPHY, P. W. and C. C. DONCASTER. A culture method for soil meiofauna and its application to the study of nematode predators. Nematologica 2: 202-214. 1957.

The difficulties and requirements of successful laboratory culturing of the meiofauna are discussed as well as some of the older culture methods. A new technique has been developed by the senior author. The second author has found it to be particularly useful for studying predators of some nematodes. The culture chamber consists of a sintered-glass micro-immersion filter with a sunk disk and a cover glass lid. It is attached by rubber tubing to a syringe. The system is filled with water and when the plunger is depressed, it is possible to irrigate the cell when necessary. There is a discussion of some predators of Heterodera.

405. NICHOLAS, W. L. A technique for obtaining axenic cultures of Rhabditid nematodes. J. of Helminth. 31: 135-144. 1957.

Two methods of setting up axenic cultures of species of Rhabditinae are described. Both methods depend upon the killing and superficial sterilization of gravid females with a chemical sterilizing agent and their transference to an innocuous medium containing antibiotics. The young worms which hatch from the eggs contained in the dead female worms are then collected aseptically. In one method merthiolate is used and in the other hydrogen peroxide.

406. STOLLER, B. B. An improved test for nematodes in the soil. Plant Dis. Reptr. 41: 531-532. 1957.

Essentially this is a modification of Miller's method of extracting nematodes from soil. The modification is the use of plastic tubes into which the nematodes descend and will remain alive for considerable time.

407. TARJAN, A. C. and H. W. FORD. A modified aceto-osmium staining method for demonstration of nematodes in citrus root tissues. Phytopathology (Abstr.) 47: 34. 1957. Stain Technology 32: 171-174. 1957.

A technique for observing nematodes in citrus feeder roots containing suberin is described. Citrus roots are immersed for 2 hours at 52° C in a solution of distilled water, 16 parts; 10% acetic acid, 10 parts; 2 percent aqueous osmium tetroxide, 2 parts. The blackened roots are washed, then bleached in 10 to 30 percent hydrogen peroxide at 32° C until the color lightens. After several washings in water, roots are dehydrated in ethanol in a graded series. Roots are then cleared in methyl salicylate at 52° C.

408. WEST, J. A. Recommended changes in recovery techniques for burrowing nematode. Plant Dis. Reptr. 41: 600-602. 1957.

It is recommended that the roots be submerged in water during the circulation period. This water incubation method offers many possibilities for increased recovery of burrowing nematodes from citrus roots. The incubation period can be reduced by several days.

NUTRITION

Nutrition -- Hosts
See also 166

409. FEZER, K. D. Factors that influence survival of red clover, with special reference to root rots. Diss. Abstr. 17: 939. 1957.

Fungi isolated from diseased red clover plants were, in decreasing order of frequency, Fusarium solani, F. oxysporum and Gliocladium sp. Their development is favoured by reduced plant vigour and short-day conditions. Disease is least severe when levels of both available potassium and available phosphorus are so low that the plant growth is limited, but is increased when only one of these elements is deficient. Methyl bromide fumigation imparts slightly longer life to plants.

410. TAPER, C. D. et al. Magnesium, calcium, and boron nutrition of the strawberry in relation to blackroot disease. Can. J. Pl. Sci. 37: 167-173. 1957.

All plants growing in a culture solution containing 0.5 ppm of boron developed both a foliar symptom characteristic of boron toxicity and certain symptoms characteristic of strawberry blackroot disease. The fact that typical foliar symptoms of boron toxicity were in all cases accompanied by certain characteristics of blackroot disease, namely, necrosis of crown and roots, seems to suggest that the latter, in this instance, were also symptomatic of boron toxicity.

Nutrition -- Organisms
See 32, 73, 84, 120, 121, 124, 131, 133, 136

SOIL FUNGICIDES
See also 11, 12

411. ABEYGUNAWARDENA, D. V. W. and R. K. S. WOOD. Effects of certain fungicides on Sclerotium rolfsii in the soil. Phytopathology 47: 607-609. 1957.

Excellent control was obtained when sodium dehydroacetate or captan, alone or with formalin, was used as a drench, but growth of seedlings following treatment with captan was considerably retarded. Chloropicrin as a fumigant was as good as these soil drenches. The materials were also tested as dry dusts mixed with infested soil.

412. BROOK, M. and C. G. C. CHESTERS. The growth of Botrytis cinerea Pers., Fusarium caeruleum (Lib.) Sacc. and Phoma foveata Foister in the presence of tetrachloronitrobenzene isomers. Ann. Appl. Biol. 45: 498-505. 1957.

The linear growth of all three fungi used in culture was reduced in the presence of vapour from any of the 3 isomers of TCNB. The isomers were fungistatic but not fungicidal.

413. COCKERILL, J. Experiments in the control of damping-off at the nursery, Orono, Ontario. Forest. Chron. 33: 201-204. 1957.

Soil acidification treatments using ferrous sulfate and sawdust mulch were proved to be ineffective in controlling damping-off. Soil fumigation using methyl bromide reduced pre-emergence losses but failed to provide adequate protection during a period of severe infection.

414. CRAM, W. H. and O. VAARTAJA. Rate and timing of fungicidal soil treatments. Phytopathology 47: 169-173. 1957.

Four rates of weekly drenches of Orthocide 75 (75 percent captan) and Tersan (75 percent thiram) and various timing schedules of Tersan applications were tested. Damping-off caused mainly by the inoculum fungus and partly by the natural Pythium flora in soil was largely controlled by the weekly application of 0.1 gm per square foot of either fungicide. For certain trees the optimum rate was 0.5 gm rather than 0.1 gm.

415. GARRETT, S. D. Effect of a soil microflora selected by carbon disulphide fumigation on survival of Armillaria mellea in woody host tissues. Can. J. Microbiol. 3: 135-149. 1957.

The author concluded that carbon disulfide directly damaged at least the peripheral mycelium of Armillaria mellea in the woody host tissues, and so facilitated invasion by Trichoderma viride and/or other fungi, thus, in the main, supporting Bliss's hypothesis to the effect that A. mellea is killed not by direct fungicidal action but through the agency of T. viride, which is relatively tolerant of the fumigant.

416. GOVINDARAO, P. and J. SUBBAIAH. Field testing of fungicides. Ind. Phytopathology 10: 50-54. 1957. (Tobacco Abstr. 2: 444. 1958)

Seven fungicides were tested for their efficacy in controlling the post-emergence damping-off disease caused by Pythium aphanidermatum. All of the fungicides except M.S. Bayer proved superior to the controls in three out of four experiments. None of the fungicides tested was found to be phytotoxic to the seedlings of chili and tobacco.

417. McCALLAN, S. E. A. and L. P. MILLER. Effect of fungicides on oxygen consumption and viability of mycelial pellets. Contr. Boyce Thompson Inst. 18: 483-495. 1957. (Rev. Appl. Mycol. 36: 708. 1957.)

Mycelial pellets of Alternaria oleracea, Aspergillus niger, Monilinia fructicola, and Myrothecium verrucaria obtained from shaken cultures were treated with various fungicides and the effect on oxygen consumption and viability observed. The uptake of fungicides and their effect on viability were also determined.

418. MALMUS, N. Zur Frage der Verhütung der Auswinterung durch Kleekrebs. (On the question of the prevention of winter injury by clover rot.) Pflanzenschutz 9: 107-109. 1957. (Rev. Appl. Mycol. 37: 99. 1958.)

Tests were made of various soil treatments for the control of Sclerotinia trifoliorum. Best results were obtained with the use of brassicol super at 35 kg./ha., a yield increase of 80 percent being obtained.

419. MEULI, L. J. Treatment of fungus-infected soil with haloketones. U.S. Pat. 2,802,768 (to Dow Chemical Co., August 13, 1957.) (Chem. Abstr. 52: 1958.)

Fungicides such as 1-chloro-2-butanone at the rate of 5 to 50 parts, by weight, per million parts soil were found to be effective against Fusarium solani, Pythium spp., and Rhizoctonia solani. Similarly, 1-bromo-2-butanone, 1-bromo-4-methyl-2-pentanone, and 1 chloro-4-methyl-2-pentanone were effective in promoting seedling emergence.

420. MILLER, LAWRENCE P. and S. E. A. McCALLAN. Toxic action of metal ions to fungus spores. Agricultural and Food Chemistry 5: 116-122. 1957.

Silver is taken up rapidly by fungus spores, so that germination can be completely inhibited after a contact time of 1 minute or less. Only mercury, and to a lesser extent copper, offer serious competition. Silver has a marked effect on the permeability of spores. Copper, zinc, and cadmium reduce germination appreciably only after some hours of contact with the spores. Materials move inward and outward more readily with spores than was supposed.

421. MILLER, P. M. and E. M. STODDARD. Importance of fungicide volatility in controlling soil fungi. (Abstr.) Phytopathology 47: 24. 1957.

Ceresan M (7.7 percent N-(ethylmercuri)-p-toluenesulfoanilide) and o-nitrochlorobenzene were highly effective in a volatile state against all fungi used. PCNB was moderately effective against Botrytis cinerea and Rhizoctonia solani but not against Fusarium or Thielavia basicola.

422. PALM, E. T. and ROY A. YOUNG. The compatibility of certain organic fungicides and

antibiotics in treatment mixtures as indicated by stability and phytotoxicity. Plant Dis. Reptr. 41: 151-155. 1957.

The fungicidal activity of various chemicals tested was not reduced significantly after aqueous mixtures of the fungicides and antibiotics had aged for 1 week. After the same interval both the fungicidal and bactericidal activities of maneb were significantly reduced. Terramycin was found to possess sufficient bactericidal potentiality to suggest further testing for control of bacterial ring rot of potatoes.

423. STRECKER, B. Untersuchungen über die Einwirkung von organischen Fungiziden auf Bodenpilze. (Studies on the action of organic fungicides on soil fungi.) Z. PfKrankh. 64: 9-35. 1957. (Rev. Appl. Mycol. 36: 273-274. 1957.)

The effect of five dithiocarbamates, four nitrobenzate derivatives, malachite green, and Ceresan, on 11 species of parasitic and saprophytic soil fungi was investigated. Most of the tests were made with poisoned nutrient substrates. The effect of the fungicides appeared to be dependent on the structure of the substances and on the physiological condition of the fungi used.

Soil Fungicides -- Cereals

424. ATKINS, J. G., E. M. CRALLEY and S. J. P. CHILTON. Uniform rice seed treatment tests in Arkansas, Louisiana and Texas, 1955-56. Plant Dis. Reptr. 41: 105-108. 1957.

Considerable variation in relative performance of the various fungicides was encountered in the tests. Certain of the non-mercurials such as Arasan SFX, Delsan AD, and Phygon XL, gave consistent stand increases.

425. EVATT, N. S. and J. G. ATKINS. Chemical control of straighthead in rice. Plant Dis. Reptr. 41: 103-104. 1957.

Straighthead of rice was significantly reduced by the application of Feralum at 1000-2000 pounds per acre.

426. HANSING, E. D. Effect of seed treatment with fungicides and with combinations of fungicides and insecticides on emergence and control of covered kernel smut of sorghum in 1956. (Abstr.) Phytopathology 47: 523. 1957.

Average emergence of non-treated seed was 46 percent. Materials used were Panogen 15, Ceresan M, Arasan SFX, Panoram 75, Captan 75, etc. Complete control of smut was obtained with above seed treatments. Higher emergence was obtained with combinations of fungicides and insecticides than with their fungicide counterparts alone.

427. JACQUET, P., CURT LEBEN and D. C. ARNY. Organic acids and the control of two seedling blights by the water-soak methods. Phytopathology 47: 377-378. 1957.

Ceresan M was effective against blights of oats infected with Helminthosporium victoriae and blights of barley seed infected with H. sativum when applied at the rate of 0.5 ounces per bushel. The effect of a synthetic mixture of organic acids was dependent on concentration, pH, length of soaking period, and temperature. For oats and barley several combinations were effective.

428. MILLER, PAUL (compiler). Uniform rice seed treatment tests in the southern rice-growing states, 1955-56. Agr. Chem. 12: 57-58, 113, 114-115. 1957.

In general, each of the fungicides tested increased emergence. Certain materials, however, gave higher stand increases more consistently than others. The materials recommended for seed treatment of rice include Arasan, Phygon XL, Ceresan M, Yellow Cuprocide, Spergon SL, and Dow 9B.

429. PURDY, LAURENCE. Differential response of dwarf bunt to seed and soil surface treatment with hexachlorobenzene. Plant Dis. Reptr. 41: 916-918. 1957.

In the Pacific Northwest the soil-surface application of hexachloro-

benzene in localized areas of heavy infestation will effectively control dwarf bunt (Tilletia contraversa) of winter wheat.

430. PURDY, LAURENCE H. The mode of action of hexachlorobenzene as a seed treatment to protect against soil-borne fungi that cause common bunt of wheat. (Abstr.) Phytopathology 47: 28. 1957.

When treated seed is planted in infested soil, the HCB vapor produces a zone around the germinating seed that is free of the smut fungi (Tilletia spp.). With growth, the seedling passes through the zone containing vaporized HCB into the unprotected zone and there becomes infected.

Soil Fungicides -- Cotton

431. BIRD, L. S., C. D. RANNEY and G. M. WATKINS. Evaluation of fungicides mixed with the covering soil at planting as a control measure for the cotton seedling-disease complex. Plant Dis. Reptr. 41: 165-173. 1957.

No single fungicide or mixture of fungicides gave good results in all locations and all soil types. The better treatments reduced attack by Rhizoctonia solani and Pythium spp. but not Fusarium spp. The results suggest that the fungicide treatments conditioned the soil microflora so as to encourage a more rapid development of Fusarium spp.

432. ERWIN, D. C., W. P. SAPPENFIELD and ROBERT KORSTEN. Effect of some fungicides on seedling diseases of cotton in the irrigated desert valleys of southern California. Plant Dis. Reptr. 41: 324-329. 1957.

Row treatments with various fungicidal chemicals induced a higher percentage of emergence and survival of plants than no treatment but the results due to treatments did not differ statistically from each other. It was concluded that differences due to fungicides in some field tests were obscured because of variation which could be attributed to environmental factors.

433. SINCLAIR, J. B. Laboratory and greenhouse screening of various fungicides for control of Rhizoctonia damping-off of cotton seedlings. Plant Dis. Reptr. 41: 1045-1050. 1957.

Seventeen fungicides, alone or in combination, were screened in the laboratory and greenhouse to test their ability to control Rhizoctonia solani on cotton seedlings. Those fungicides used alone showing the most promise were the Omadine derivatives (2-pyridinethione 1-oxide; the zinc, manganese, and disulfide derivatives), PCNB, captan, and nabam. The combined fungicide treatments showing the most promise were: captan in combination with either PCNB or the zinc salt of Omadine; nabam in combination with Mylone or zinc sulfate, and PCNB in combination with Mylone.

434. WHITEHEAD, MARVIN D. and NORMAN E. BROWN. In-the-furrow application of fungicides for the control of cotton seedling disease -- damping-off and nub-root. Plant Dis. Reptr. 41: 419-423. 1957.

The fungicide treatments captan, nabam, PCNB plus nabam, and nabam plus zinc sulfate gave higher plant populations that produced yields more than two-fold that of the untreated plots.

Soil Fungicides -- Evaluation

435. DARBY, J. F. In Annual Report of the Agricultural Experiment Stations, Florida for the year ending June 30, 1956, pp. 148-155. (Rev. Appl. Mycol. 36: 809. 1957.)

In seed-bed tests against unspecified damping-off and root rots, an allyl alcohol-DD-formaldehyde formula at 40-40-150 was better than the 25-40-100 formula, and 4 1/2 gallons per acre of 83 percent emulsifiable EDB was satisfactorily substituted for DD. In addition UF Concentrate-85 containing 25 percent urea and 60 percent formaldehyde was as effective as 37 percent formaldehyde in equal amounts. Mixtures of allyl alcohol

(40 gallons per acre) and Vapam (50 and 75 gallons per acre) gave outstanding control.

436. DREXEL, R. E. Stabilized dithiocarbamate fungicidal compositions. U.S. Patent 2,797,181 (to E. F. duPont de Nemours. June 25, 1957). (Chem. Abstr. 51: 13306. 1957.)

A 3 percent solution of Na methyldithiocarbamate containing Na OAC as stabilizer sprayed onto plowed fields several days before planting tobacco was effective in controlling damping-off organisms and Phytophthora infestans.

437. FAWCETT, C. H., D. M. SPENCER and R. L. WAIN. Investigation on fungicides. II. Aryloxy- and arylthio-alkanecarboxylic acids and their activity as fungicides and systemic fungicides. Ann. Appl. Biol. 45: 158-176. 1957. (Rev. Appl. Mycol. 36: 709. 1957.)

In general, the arylthio-derivatives were more fungicidal than their aryloxy-analogues in plate tests for fungistatic effect on six fungi and as systemic fungicides against Botrytis fabae on broad beans and Alternaria solani on tomatoes. Most of the compounds were unsatisfactory both as external and as systemic fungicides.

438. FORSBERG, J. L. The fungicidal effect of some halogenated dinitrobenzenes on Curvularia lunata and Fusarium oxysporum f. gladioli. (Abstr.) Phytopathology 47: 12. 1957.

Curvularia was much more resistant to the chemicals than was Fusarium. Against both fungi the fluorine-containing compounds were much more fungicidal than were the other compounds.

439. HARTZFELD, EARL G. Terraclor, a new soil fungicide. Agr. Chem. 12: 30-33. 1957.

Terraclor, the active ingredient of which is pentachloronitrobenzene, is recommended for control of a number of soil-borne diseases including those of strawberries, mushrooms, tomatoes, beans, and ornamentals. Its vapor pressures are negligible thus accounting for the good residual action. Terraclor is compatible with insecticides and fungicides with pH of 7 or below.

440. HOWARD, F. L. and BARBARA C. CORMIER. Halogen-aceto compounds as fungicides. (Abstr.) Phytopathology 47: 525. 1957.

Twenty-five nonmetallic fungicides of potential value in plant pathology were disclosed in a study of 35 compounds. The influence of molecular structure on fungitoxicity was evident.

441. MAHAPATRA, G. N. Synthesis of isomeric bromothiazolylamines and the use of their mercurated derivatives as fungicides and bactericides. J. Am. Chem. Soc. 79: 988-990. 1957. (Rev. Appl. Mycol. 36: 656. 1957.)

In this report of assays of synthesized and mercurated bromothiazolylamines for their activity against Piricularia oryzae, the phenylthiazolylamines containing bromine in the thiazole nucleus are stated to be the most potent, inhibiting sporulation completely at a concentration of 30 ppm. All the tri- and a few dibromo derivatives with a bromine atom in the thiazole nucleus showed slightly enhanced toxicity to the fungus. All the mercurated compounds exerted a powerful fungicidal effect.

442. SOIL FUMIGATION WITH VAPAM. Agr. Chem. 12: 47, 119. 1957.

A general description of the methods of application and extent of use of Vapam to date. At present it is useful for application to ornamental, vegetable seed-bed, turf, and nursery soils. Application methods include feeding into irrigation systems, shallow injection techniques, row placement, and broadcasting by means of a sprinkler system.

443. TORGESON, D. C., D. M. YODER and J. B. JOHNSON. Biological activity of Mylone breakdown products. (Abstr.) Phytopathology 47: 536. 1957.

It was believed that the hydrolysis products or a combination of them were responsible for the fungicidal, nematocidal and herbicidal properties of the compound. Among the materials identified were methylisothiocyanate, formaldehyde, hydrogen sulfide, and monomethylamine. None of these materials alone was sufficiently fungicidal to inhibit Pythium sp. in soil.

444. VASIL'EVSKY, A. P. and I. V. KLIMOVICH. Use of the preparation NIUIF-2 (granosan) in horticulture. Bull. Bot. Gdn. Moscow 1957, 27: 89-94. 1957. (Rev. Appl. Mycol. 36: 539. 1957.)

Experiments at the Central Botanical Garden of the U.S.S.R. Academy of Sciences showed that granosan can be used effectively in horticulture. Wet seed treatment is carried out by submerging seed in a 1:1000 suspension for 1 to 2 minutes, while for dry treatment 2 to 4 gm granosan are required per kg seed. Gladiolus corms are submerged in a 1 to 50 suspension for 30 minutes, left to dry for 2 hours, and then planted. Methods are also described for disinfecting heaps of humus soil.

445. ZENTMYER, G. A. and J. L. ERSPAMER. Vapam as a soil fumigant and as a chemotherapeutant. (Abstr.) Phytopathology 47: 38-39. 1957.

With dosages of 200-250 ppm Vapam at 3 to 4 gallons per square foot, kill of Phytophthora cinnamomi was obtained to the depth of sampling (24 inches), with no recovery of the fungus 9 months to 1 year after treatment in some cases. Tree injury was appreciable even at lower dosages in some cases, particularly on weak trees, and was severe when temperatures were high at the time of or following treatment.

Soil Fungicides -- Forage Crops

446. ATHOW, KIRK L. The effect of seed treatment on seedling stand and forage yield of alfalfa and red clover. Phytopathology 47: 504-506. 1957.

No statistically significant differences in yield were found between treated (Arasan or Vancide 51) and untreated alfalfa and red clover seed planted in each of 4 years in plots at seeding rates of 2 to 12 pounds per acre. The seedling stand of approximately 14 percent of the alfalfa lots and 5 percent of the red clover lots were significantly increased by seed treatment.

447. HASKETT, W. C., E. D. HANSING and E. L. SORENSEN. Chemical control of damping-off in alfalfa cuttings. (Abstr.) Phytopathology 47: 15. 1957.

The most satisfactory control was obtained by Captan 50W and by stem sterilization. Treatment with Captan 50W resulted in healthy plants, no toxic effects, and a slight adverse effect on nodulation. Vancide 51 and Dithane D14 effectively controlled damping-off but induced chlorosis, suppressed normal root development, and prevented nodulation.

448. JOHNSON, HOWARD W. Effect of seed and soil treatments on alfalfa hay yields. (Abstr.) Phytopathology 47: 18. 1957.

Neither seed nor soil treatments with fungicides proved beneficial in alfalfa culture at this location.

Soil Fungicides -- Fruit

449. JEFFERS, WALTER F. Soil treatments for control of the red stele disease of strawberries. Plant Dis. Reptr. 41: 415-418. 1957.

Under field conditions none of the chemicals used resulted in complete eradication of the red stele fungus but methyl bromide and chloropicrin at relatively low rates gave a high degree of control.

450. WAGNON, H. KEITH and J. A. TRAYLOR. Results of some soil treatments for elimination of peach yellow bud mosaic virus from soil. (Abstr.) Phytopathology 47:

537. 1957.

Soil from the root zone of YBM-affected peach trees at different depths was treated with the chemicals Nemagon, carbon bisulfide, Vapam, methyl bromide, and DD, and with steam. YBM showed in 25 of 57 seedlings that grew in untreated lower soil. No YBM showed in the 425 seedlings that grew in the treated soil or in the 38 seedlings that grew in the untreated upper soil.

451. WILHELM, STEPHEN. Chloropicrin gives promising control of Verticillium wilt in strawberry. (Abstr.) Phytopathology 47: 37. 1957.

Chloropicrin was outstanding in fungicidal properties against Verticillium at 3 ml per square foot injected 6 inches deep into soil with moisture content optimal for planting.

Soil Fungicides -- Laboratory Tests

452. KENDRICK, J. B. Jr. and G. A. ZENTMYER. Laboratory evaluation of chemicals as potential soil fungicides. (Abstr.) Phytopathology 47: 20. 1957.

Of approximately 800 compounds tested in the past 2 years, very few that showed activity in agar tests were also effective in soil. Nitroso-methyl carbamate, nitrile, and thiocyanate derivatives showed promise as soil fungicides. PCNB was specifically effective at 10 ppm as a fungistat against Rhizoctonia, Sclerotinia, and Sclerotium; sodium N-methyldithiocarbamate (Vapam) was generally effective at 10 ppm as a fungicide. Captan, thiram, chloranil, dichlone, and metallic salts of dithiocarbamates were not highly active as soil fungicides.

453. ZANARDI, D. Prove di laboratorio sull' efficacia antifungina di alcuni anticrittogamici. (Laboratory tests of the antifungal efficacy of certain fungicides.) Notiz. Malatt. Piante 39: 67-71. 1957. (Rev. Appl. Mycol. 36: 707. 1957)

Soil in which plants had been attacked by various fungi, Sclerotium cepivorum, Fusarium spp., and Peronospora parasitica, was placed in Petri dishes and treated with various non-copper-containing fungicides. The best results were given by amicina (quinosol 20 percent) which completely controlled fungi and bacteria, followed by Vapam, completely fungicidal but only partly bactericidal, nabam, zineb and PCNB in that order, the last named not being particularly active against fungi or bacteria.

Soil Fungicides -- Ornamentals

454. ALEXANDER, PAUL M. Etiology and control of poinsettia root and stem rot. Phytopathology (Abstr.) 47: 1. 1957.

Rhizoctonia solani and a Pythium sp. were the only organisms found to be pathogenic. Captan, Terraclor and zineb were effective as sand drenches but ineffective as soil drenches. Semesan and Pano-Drench 4 were equally effective as sand or soil drenches. Ferbam as a sand drench discolored the roots and was ineffective when used as a soil drench.

455. AYCOCK, ROBERT. Soil treatments reduce decay of Dutch iris bulbs. Research & Farming, North Carolina Agr. Expt. Sta. 16: 9. 1957.

Terraclor 75 percent wettable powder (75 percent pentachloronitro-benzene) applied broadcast, in a band in the centre of the row and as a surface drench; and Captan 50 percent applied broadcast proved effective. Row treatments using Terraclor were particularly promising.

456. MAGIE, R. O. Annual Report of the Agricultural Experiment Stations, Florida, for the year ending June 30, 1956. 1957. (Rev. Appl. Mycol. 36: 811. 1957.)

When Vapam, Crag Mylone and Terraclor were mixed in the row by rototiller at 100, 150, and 200 pounds per acre in a field heavily infested with Stromatinia disease of gladiolus (Sclerotinia gladioli), Crag Mylone was most effective in controlling root rot and gave the highest quality

flowers. Terraclor and Crag Mylone produced the heaviest corms. Flooding of the soil for 2 months in summer was almost as effective as chemical treatment combined with flooding for 2 weeks, and treatment with Vapam plus Terraclor or Crag Mylone plus Terraclor at 100 pounds active ingredient per acre mixed well with moist soil 2 weeks before planting was as effective as flooding. In controlling Fusarium wilt (Fusarium oxysporum f. gladioli) Crag Mylone at 100 and 200 pounds per acre was significantly better than Vapam at the same concentration.

457. SCHOLTEN, G. Wortelrot bij Cyclamen. (Root rot of cyclamen.) Tijdschr. PlZiekt. 63: 30. 1957. (Rev. Appl. Mycol. 36: 587, 1957.)

In comparative inoculation experiments with Cylindrocarpon radicicola and Thielaviopsis basicola only the former caused collapse of the plants. The incidence of C. radicicola was reduced during two seasons by immersion of the root clumps in solutions of captan or thiram.

458. STODDARD, E. M. A Fusarium rot of geraniums and its control. Plant Dis. Reptr. 41: 536. 1957.

Control of both the Fusarium and the bacterial black leg was obtained by using soil drenches containing a mixture of 250 ppm oxyquinoline sulfate and 200 ppm streptomycin.

Soil Fungicides -- Special Crops

459. KAR, K. and D. D. SRIVASTAVA. Fungicidal treatment of sugarcane setts. Indian Sugar 7: 333-334. 1957. (Rev. Appl. Mycol. 37: 111. 1958.)

In experiments at different locations several fungicides proved ineffective against red rot (Glomerella tucumanensis). In an exploratory trial the incidence of smut (Ustilago scitaminea) was reduced from 6.2 to 0.9 and 1.1 percent by 7-minute suspension of the setts in 0.25 percent perenox or 1 percent agrosan, respectively, before planting in furrows contaminated with spore powder from freshly collected "whips".

Soil Fungicides -- Technique

460. GARBER, R. H. and L. D. LEACH. The use of chemical indicators in the study of distribution of row-treatment fungicides. (Abstr.) Phytopathology 47: 521. 1957.

The authors used radioactive rubidium 86, an oil-soluble safranin dye, and a fluorescent dye. Radio-autographs made from soil profiles taken from the rubidium-sprayed rows indicated where the material was located.

461. KUHFUSS, K. H. Beitrag zur Methodik der Fungizidprufung von Nass- und Trockenbeizmitteln. (Contributions to the technique of the fungicidal assay of liquid and dry preparations.) Phytopath. Z. 28: 281-284. 1957. (Rev. Appl. Mycol. 36: 482. 1957.)

The author developed a method for the assay of fungicides based on a combination of Forsberg's and Jake's (Chron. Bot. 4: 515. 1938) in which cotton threads are used as carriers of the chemicals and nutrient agar for the fungus, using Phoma lini and Botrytis cinerea on malt agar plates at 26° C. The zones of inhibition produced by 0.3 percent germisan solution and germisan dust were visible after 3 days' incubation, the former giving a much wider zone.

462. THOMAS, W. D. Jr. A soil-column apparatus for the study of soil fungicides. (Abstr.) Phytopathology 47: 535. 1957.

The apparatus consists of a glass tube to one end of which are attached three glass hooks. Soil is added to the tube to any desired depth. Small filter-paper discs impregnated with a spore-mycelial suspension of the test fungus may be placed at any position in the soil column. Fungicides may be mixed with the soil and leached into the cup with water. Paper discs may

then be transferred to agar.

Soil Fungicides -- Tobacco
See also 230

463. LAUTZ, W. Treatment of black root rot infested soil with Vapam, chlorobromopropene, and allyl bromide. Plant Dis. Reptr. 41: 174-176. 1957.
The black root rot disease (Thielaviopsis basicola) was controlled effectively by allyl bromide, Vapam, and chlorobromopropene, and eliminated by allyl bromide and Vapam at two stronger concentrations.

464. MILLER, P. (compiler). Control of Fusarium wilt and root-knot nematode of tobacco. Agr. Chem. 12: 52-55. 1957.
Of the treatments, ethylene dibromide at 5 gallons per acre in fields 1, 2 and 3, and 2.5 gallons split treatment in field 3, gave best results, followed by DD and control. In field 1, where wilt was light, the increase in weight was due to control of root knot (Meloidogyne sp.), whereas in field 2 the weight increase was due to control of the root knot-Fusarium wilt complex.

465. MORGAN, O. D. The control of black shank of tobacco with various soil drenches and their effect on the tobacco plant. (Abstr.) Phytopathology 47: 452. 1957.
Fifty chemicals were screened in the laboratory and greenhouse against Phytophthora parasitica var. nicotianae over a period of four years. Field trials were inconclusive but in greenhouse trials certain chemicals proved to be consistently effective.

466. ORTIZ, G. and L. E. VALDERRAMA. Efectos del producto Vapam 4S(metil-ditiocarbamato de sodio anhidro) en el control de la enfermedad de la "Dormidera" del tabaco. (Effect of the product Vapam 4S in the control of the tobacco disease "Dormidera".) Agr. Trop. 13: 479-482. 1957. Spanish. (Tobacco Abstr. 1: 492. 1957.)
Tobacco plants treated with a solution of 1 liter Vapam to 10 liters water had a mortality of 17.8 percent; with a solution of 1:3 a mortality of 55.5 percent and control plants a mortality of 83.3 percent when infected with Granville wilt (Pseudomonas solanacearum).

Soil Fungicides -- Turf

467. COUCH, H. B. and HERBERT COLE Jr. Chemical control of melting out of Kentucky bluegrass. Plant Dis. Reptr. 41: 205-208. 1957. (Abstr.) Phytopathology 47: 6. 1957.
Acti-dione, Kromad, Omadine, captan, and Terramycin all gave significant reductions in intensity of the leafspot phase of the disease. Acti-dione caused a temporary retardation in growth.

Soil Fungicides -- Trees

468. VOLGER, CHRISTIANE. Über Bekämpfungsmöglichkeiten pilzparasitärer Keimlingskrankheiten unserer Nadelbäume. (On the possibilities of combating seedling diseases of our conifers caused by parasitic fungi.) Allg. Forstz. 12: 114-116. 1957. (Rev. Appl. Mycol. 36: 797. 1957.)
The most helpful line of approach to the problem is considered to be prophylactic, consisting of simple measures to protect the seedlings from any delay in growth and from physiological weakening. In the tests with chemical disinfectants the most effective seed dressing was tripomol, a Dutch preparation based on thiram, and the fungicidal action of which persisted for 11 weeks. Zineb proved useful as a spray but was ineffectual as a seed protectant. Dusting with brassicol gave good results in a seedbed experiment on Douglas fir.

Soil Fungicides -- Vegetables
See also 55, 237

469. ANDREN, F. Bekämpningsförsök mot klumprotsjuka. (An experiment in the control of club root disease.) Växtskyddsnotiser, Stockholm, 21 (2): 34-35. 1957. (Rev. Appl. Mycol. 36: 802. 1957.)

Excellent control of club root (Plasmodiophora brassicae) on Brussels sprouts is reported from Farentuna, Sweden, where 25 kg brassisan was strewn over an area of about 400 square meters and worked into the soil before planting.

470. BRAUER, H. O. and R. W. RICHARDSON. El chile. Indicaciones generales para su cultivo. (Chilli. General directions for its cultivation.) Foll. Divulg. Secret. Agric. Mex. 23: 26 pp. 1957. (Rev. Appl. Mycol. 36: 745. 1957.)

On pages 17-24 of this publication reference is made to the principal nursery diseases of chilli in Mexico, which are damping-off (Pythium spp.) and root rot (Rhizoctonia spp.). Pythium is controlled by Arasan 50 percent or Semesan 30 percent, each at 12.5 gm per 10 liters water; Rhizoctonia spp. by yellow copper oxide or zerlate at 18 and 24 gm, respectively.

471. BREMER, H. Zur Behandlung von Bohnensaatgut mit kombinierten Beizmitteln. (On the treatment of bean seed with combined dressings.) Anz. Schadlingsk, 30: 84-85. 1957. (Rev. Appl. Mycol. 37: 128. 1958.)

Of the various fungicide-insecticide combinations tested for the seed treatment of beans (Phaseolus vulgaris), captan and COBH, each with dieldrin, gave the best growth, and organic mercury with lindane the poorest. Certain insecticides had an effect even in the absence of insect attack, apparently due to action on micro-organisms, the poor results with lindane and the increase of infection by Rhizoctonia crocorum associated with the use of aldrin probably being explainable in this way. COBH with mercury gave good control of Colletotrichum lindemuthianum, 86 healthy seedlings developing from 100 infected seeds as compared with only 29, all infected, in the untreated.

472. BROOK, M. Tetrachloronitrobenzene as a fungicide. Trans. Brit. Mycol. Soc. 40: 164-165. 1957. (Rev. Appl. Mycol. 36: 603. 1957.)

When used to control dry rot of potatoes (Fusarium caeruleum) tecnazene may retard sprouting.

473. CAMPBELL, LEO. Control of club root of cauliflower. (Abstr.) Phytopathology 47: 518. 1957.

Zineb reduced club root (Plasmodiophora brassicae) development 90.3 percent and increased yield of tops 360 percent. Terraclor (75 percent PCNB) reduced club root development 91.1 percent and increased yield 257 percent. Fungicides were (1) added to transplanting water, (2) mixed into soil in strips. Best results were obtained with method (2).

474. COX, R. S. Control of diseases in the celery seedbed. Proc. Fla. Hort. Soc. 69 (1956): 242-244. 1957. (Rev. Appl. Mycol. 36: 631. 1957.)

Methyl bromide and chloropicrin were outstanding as soil fumigants in control of common root diseases in celery seedbeds in Florida, caused by Fusarium sp., Pythium sp. and Rhizoctonia (Corticium) solani.

475. DAVISON, ARLEN D. and JOHN R. VAUGHN. Effect of several antibiotics and other organic chemicals on isolates of fungi which cause bean root rot. Plant Dis. Reptr. 41: 432-435. 1957.

Reports results of screening tests with various established and experimental organic chemicals, including antibiotics, against isolates of bean root rot fungi.

476. DRANSFIELD, M. The effects of tetrachloronitrobenzene on the soil microflora. Trans. Brit. Mycol. Soc. 40: 165. 1957. (Rev. Appl. Mycol. 603. 1957.)

Five percent tetrachloronitrobenzene used at 1/2 ounce per square yard against Botrytis cinerea on lettuce, had no effect on the microflora of the soil. At ten times this rate the number of species of fungi was reduced and the number of bacteria was markedly increased. The fungicide decreased the resistance of lettuce to damping-off by Pythium.

477. FOLSOM, D. Verticillium wilt of potato in relation to fungicides added to the fertilizer. Am. Potato J. 34: 1-5. 1957. (Rev. Appl. Mycol. 36: 613. 1957.)

Eight fungicides were tested as fertilizer admixtures for the control of Verticillium albo-atrum on Kennebec potatoes. Field results were not promising for any of the preparations tested. Only HD-160 reduced wilt but it also caused stunting.

478. FREEMAN, T. E. and E. C. TIMS. Fungicidal drenches for pink root control in shallots. Phytopathology 47: 12. 1957.

By means of Forsberg's string method 44 fungicides were tested in the laboratory for their ability to kill the pink root fungus (Pyrenochaeta terrestris) in culture. Seven fungicides were effective at rates that would be practical to use on a field basis. All fungicides except maneb were organic mercury compounds.

479. HAGEDORN, D. J. Field and laboratory tests of seed protectants for canning peas. Phytopathology 47: 70-72. 1957.

Towel and cold chamber tests appeared to be more precise than the tank tests. KF467 and the various Phygon preparations were generally the most effective from 1949 through 1952. Orthocide was superior in 1953.

480. HOUGHLAND, G. V. C. and LILLIAN C. CASH. Carry-over effects of PCNB applied to the soil for control of potato scab. Am. Potato J. 34: 85-88. 1957. (Rev. Appl. Mycol. 36: 662. 1957.)

Experiments at Beltsville confirmed the effectiveness of PCNB as a soil fungicide for control of potato scab (Streptomyces scabies). Effects were greatest in the first season after application, infection increasing by 3 to 5 times during the following season when no further applications were made. Not more than 150 pounds per acre should be applied in the row.

481. KENDRICK, J. B. Jr., A. O. PAULUS and J. DAVIDSON. Control of Rhizoctonia stem canker of lima bean. (Abstr.) Phytopathology 47: 19-20. 1957.

The disease was controlled in the field by seed furrow spray and dust applications of a mixture of PCNB and captan. Treated plots 4 weeks from seeding and treating had an average reduction of 71.5 percent in number of infected plants, an 82.4 percent reduction in infection severity, and almost complete control of post-emergence damping-off, with no evidence of phytotoxicity in treated plots.

482. LEACH, L. D. and W. S. SEYMAN. Localized fungicide placement for control of garlic white rot. (Abstr.) Phytopathology 47: 527. 1957.

Fungicides were applied as wettable powders or solutions sprayed into the furrow containing the garlic cloves, at 10 pounds actual fungicide per acre. PCNB gave good protection.

483. PLAKIDAS, A. G. Vapam ineffective against Fusarium wilt of tomato. Plant Dis. Reptr. 41: 778-779. 1957.

Vapam at a concentration of 1 quart per 3 gallons of water was applied with a sprinkling can at the rate of 1 quart per 64 square feet. Although apparently complete control of nematodes was obtained from the treatment no control of fusarial wilt of tomato was obtained.

484. RICH, SAUL. Griseofulvin, lithium salts, and zinc glass frit for control of cabbage club root. Plant Dis. Reptr. 41: 1033-1035. 1957.

Griseofulvin was found to be effective in controlling club root (Plasmodiophora brassicae) when used as a soil treatment. Zinc glass frit reduced the amount of disease but lithium salts were ineffective when applied as soil treatments. No correlation was found between severity of clubbing and height of plant.

485. ROSSER, W. R. Control of club root of Brassicae. Plant Path. 6: 42-44. 1957.

A trial on the control of club root (Plasmodiophora brassicae Wor.) by the use of griseofulvin, etc. Griseofulvin and cadmium chloride both gave a poor control of the disease. The weight of green matter resulting from the use of either compound was significantly lower than that obtained by the use of mercuric chloride.

486. SCHMIDT, TRUDE. Unter welchen Krankheiten leiden unsere Salatkulturen und wie bekämpfen wir die Erreger? (From what diseases do our cultivated lettuces suffer and how do we control the causal organism?) Pflanzenarzt 10: 62-63. 1957. (Rev. Appl. Mycol. 36: 746. 1957.)

Rot of lettuce caused by Sclerotinia sp. is controlled in Austria by brassicol at 30 to 40 gm per square meter.

487. WENZL, H. and R. KREXNER. Untersuchungen über die Wirking der Saatgutbeizung bei Rübe. (Studies on the effect of seed treatment in beet.) PflSch-Ber. 18: 119-170. 1957. (Rev. Appl. Mycol. 36: 803. 1957.)

In the main experiments notable results were obtained only where early-sown seed encountered conditions causing crust development at the soil surface or otherwise discouraging growth. Organic mercury-lindane preparations proved best, exhibiting combined activity against blackleg, wireworm, and Cercospora infection of the seed.

488. WILLIAMS, P. H. and JUDITH HACK. The effect of certain soil treatments on Didymella stem rot of tomatoes. Part I. Glasshouse experiments. Ann. Appl. Biol. 45: 304-311. 1957.

In soil treated with formalin and subsequently inoculated, the number of diseased plants was about half that in steamed soil. Steamed soil remained susceptible to infection by Didymella lycopersici for 4 months.

489. WILSON, J. D. Initial and subsequent control of radish yellows by various treatments during eight successive plantings. (Abstr.) Phytopathology 47: 538. 1957.

Only three of the 20 compounds used in 40 different treatments were still giving good control in the last (eighth) planting, made about 130 days after treatment. Of the three, chloropicrin was the most durable and effective, followed in turn by Mylone and Vapam.

TOXINS AND OTHER SUBSTANCES OF BIOTIC ORIGIN

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490. CURTIS, ROY W. Survey of fungi and actinomycetes for compounds possessing gibberellinlike activity. Science 125: 646. 1957.

Approximately 1000 fungus and 500 actinomycetes (unidentified), that were obtained from the soil by routine plating-out procedures, were involved. It was concluded that the production of the gibberellins by fungi and actinomycetes is not widespread.

491. CURTIS, ROY W. Translocatable plant growth inhibitors produced by Penicillium thomii and Arachniotus trisporus. Plant Physiol. 32: 56-59. 1957.

Penicillium thomii and Arachniotus trisporus were found to produce

translocatable plant growth inhibitors when cultured on corn steep-cerclose medium. When one of the primary leaves of bean plants was treated with the culture filtrates the leaves were inhibited on the side of the treated leaf.

492. DE, P. K. and L. N. MANDAL. Physiological diseases of rice. Soil Sci. 84: 367-376. 1957.

Symptoms are discoloration of leaves, stunted growth, and damaged root system. The evidence obtained does not support the view that the physiological disease of rice, as observed in normal soils, is due either to lack of oxygen, or to an accumulation of ferrous iron or production of hydrogen sulfide in soil.

493. DIENER, T. O. and M. L. WEAVER. A Penicillium causing wilt in peach and pear seedlings. (Abstr.) Phytopathology 47: 519. 1957.

The Penicillium species, isolated from Lovell peach roots, caused wilting of seedlings. The organism was not parasitic but produced a wilt-inducing toxin.

494. EARHART, R. W. Comparison of two techniques for evaluating pathogenicity of Helminthosporium cultures. (Abstr.) Phytopathology 47: 8. 1957.

Two recently developed techniques in which the water-soluble toxins produced by pathogenic organisms are substituted for the active organism are being used to measure pathogenic activity.

495. GÄUMANN, E. Über Fusarinsäure als Welketoxin. (On fursarinic acid as a wilt toxin.) Phytopath. Z. 29: 1-44. 1957. (Rev. Appl. Mycol. 36: 736. 1957.)

This is a detailed review and discussion of fusarinic acid in relation to certain wilt diseases of plants, with special reference to Fusarium bulbigenum var. lycopersici on tomato.

496. GÄUMANN, E. Fusaric acid as a wilt toxin. Phytopathology 47: 342-357. 1957.

Fusaric acid is synthesized by at least six parasitic and facultative parasitic species of the Hypocreaceae. The action spectrum of fusaric acid extends from bacteria to flowering plants and is therefore far wider than that of the pathogens themselves.

497. GÄUMANN, E. and W. LOEFFLER. Über die Wirking von Fusarinsäure auf dis Wasserpermeabilitat der Markzellen von Tomatenpflanzen. (On the action of fusarinic acid on the water permeability of pith cells of tomato plants.) Phytopath. Z. 28: 319-328. 1957. English summary. (Rev. Appl. Mycol. 36: 503-504. 1957.)

It is reported that increasing concentrations of the toxin not only enhance the intensity of the disturbance of permeability but change its direction. Two phases in the modification of permeability can be detected. They are related to fusarinic acid concentration.

498. GIBBERELLIC ACID EFFECT ON PLANT DISEASES AMONG REPORTS AT A. P. S. MEETING AT STANFORD. Agr. Chem. 12: 58, 107. 1957.

There is little likelihood that gibberellic acid will prove valuable in the direct control of plant diseases. In tests with tomatoes, treatment of the plants with from 5 to 20 ppm of the acid stimulated growth for almost 2 weeks. The low concentration reduced the severity of Fusarium wilt disease; the high concentration increased its severity.

499. JOHNSTON, P., R. R. ROMANKO and H. E. WHEELER. Association of the reactions to the crown rust fungus and to Helminthosporium victoriae in oat selections. Phytopathology 47: 18. 1957.

Treatment of more than 150 bushels of oats from varieties susceptible to Helminthosporium victoriae with a toxin produced by this fungus has yielded a large number of resistant selections.

500. LUDWIG, R. A. Toxin production by Helminthosporium sativum and its role in pathogenicity. Phytopathology 47: 22. 1957.

The invasion of cereal seedlings by Helminthosporium sativum is facilitated by toxic substances that the fungus produces. The growth of cereal seedlings is strongly inhibited by the toxins. Plants treated with the toxin develop many of the symptoms of the disease and are highly susceptible to invasion by the fungus.

501. LUDWIG, R. A. Toxin production by Helminthosporium sativum and its significance in disease development. Can. J. Bot. 35: 291-303. 1957.

A loose correlation was found to exist between toxin production and pathogenicity in a limited number of Helminthosporium strains.

502. MIRCHINK, T. G. (On fungi causing toxicity of podsolized soil of various cultivation grades.) (Microbiology) 26: 78-86. 1957. (In Russian, English summary). (Rev. Appl. Mycol. 37: 23-24. 1958.)

Undercultivated turf-podsol soils were characterized by their high toxicity caused by toxic species of fungi. The most toxic organisms were Penicillium cyclopium, P. nigricans, P. paxilli, and P. jantinellum. Toxic fungi are capable of excreting toxins directly into soil on addition of small quantities of organic matter.

503. NAEF-ROTH, STEPHI. Über die parasitogenen und toxigenen Veränderungen der Atmungsintensität bei Tomaten. (On the parasitogenic and toxigenic changes of respiratory intensity in tomatoes. Z. PflKrankh. 64: 421-426. 1957. English summary. (Rev. Appl. Mycol. 36: 792. 1957.)

The author summarizes and discusses the results of studies on the changes in the respiration rate of tomatoes induced by infection with Fusarium (bulbigenum var.) lycopersici and the action of its toxins, fusaric acid and lycomarasmin. Reference is further made to the literature on several other diseases characterized by increased respiration.

504. ORSENIGO, M. Estrazione e purificazione della cochliobolina, una tossino prodotta da Helminthosporium oryzae. (Extraction and purification of cochliobolin, a toxin produced by Helminthosporium oryzae.) Phytopath. Z. 29: 189-196. 1957. (Rev. Appl. Mycol. 36: 715. 1957.)

A new toxin, cochliobolin, has been isolated and crystallized from culture filtrates of Helminthosporium oryzae. It appears as a crystalline white powder, m.p. 180-182° C, scarcely soluble in water, but completely soluble in chloroform and acetone. Cochliobolin is very toxic to rice seedlings, inhibiting the growth of roots and coleoptiles at very low concentration. Preliminary trials indicate that the inhibition results from severe alterations of the plasma.

505. PAQUIN, R. and E. R. WAYGOOD. The effect of Fusarium toxins on the enzymic activity of tomato hypocotyl mitochondria. Can. J. Bot. 35: 207-218. 1957.

Lycomarasmin and fusaric acid, two toxins produced by Fusarium oxysporum f. lycopersici, inhibit the succinoxidase and cytochrome oxidase activity of the mitochondria at a concentration of 10^{-2}M. The role of toxins in Fusarium wilt of tomatoes is discussed.

506. PRINGLE, R. B. and A. C. BRAUN. The isolation of the toxin of Helminthosporium victoriae. Phytopathology 47: 369-371. 1957.

The biologically active material appears to be polypeptide in nature. The isolated toxin inhibits the growth of susceptible oat roots at a concentration of 0.01 μg per ml.

507. SADASIVAN, T. S. and L. SARASWATHI-DEVI. Vivotoxin and uptake of ions by plants. Curr. Sci. 26: 74-75. 1957. (Rev. Appl. Mycol. 36: 695. 1957.)

A disturbance in ionic uptake was observed in cotton plants grown in soil inoculated with Fusarium vasinfectum. It is suggested that the loss

in semi-permeability of the cells of apparently healthy susceptible plants may be due to the action of vivotoxins, but the amount of toxin is insufficient to produce visual symptoms.

508. SELMAN, I. W. and G. F. PEGG. An analysis of the growth response of young tomato plants to infection by Verticillium albo-atrum. Ann. Appl. Biol. 45: 674-681. 1957.

Infection of seedling tomatoes with Verticillium albo-atrum checked growth but did not result immediately in leaf yellowing. Localized wilting occurred in some plants 2 weeks after the check to growth was evident. Eight weeks after inoculation, dry weights of leaf, stem, and root were decreased by 72, 70, and 65 percent, respectively. Plants in which two-thirds of the root system had been killed by crushing were placed in contact with mycelium in soil. This initial root injury did not significantly affect the growth of infected plants. The data accord with a toxic theory of damage to infected plants, but the slow development of chlorosis and wilting symptoms in the young plants suggested a greater tolerance of the toxin than is found in older plants.

509. STILLE, B. Schädigungen an Pflanzenwurzeln durch Kulturfiltrate von Mikroorganismen. (Injuries to plant roots by culture filtrates of micro-organisms.) Arch. Mikrobiol. 26: 71-82. 1957. (Rev. Appl. Mycol. 36: 777. 1957.)

Experiments were carried out to determine the influence of culture filtrates of some plant pathogenic fungi, i.e., Alternaria solani, A. tenuis, Pythium debaryanum, and Fusarium oxysporum, and numerous nonparasitic micro-organisms on the roots of young Lepidium sativum, flax, pea, and wheat plants. A high proportion of the filtrates caused severe or at least distinct injury even after an exposure of only 2 hours. The damage was readily recognizable on application of the tetrazolium test since the affected portions of the roots lose, to a greater or lesser extent, the capacity for formazan production which is characteristic of intact material. The loss is accompanied by failure to make further growth, so that the future of the plants is decided by the regenerative activity of the remaining roots.

510. SUBBA-RAO, N. S. In vivo detection of gibberellic acid in "foot-rot" infected rice (Oryza sativa L.). Proc. Indian. Acad. Sci. Sect. B; 45: 91-94. 1957. (Rev. Appl. Mycol. 36: 724. 1957.)

A chromatographic method for qualitative and quantitative determination of gibberellic acid in Fusarium moniliforme-infected rice plants is described. The results indicate a greater accumulation of gibberellic acid in shoots than in roots of the rice plant susceptible to the fungus.

511. TALBOYS, P. W. The possible significance of toxic metabolites of Verticillium albo-atrum in the development of hop wilt symptoms. Trans. Brit. Mycol. Soc. 40: 415-427. 1957. (Rev. Appl. Mycol. 37: 177. 1958.)

The intensity of the toxin-induced syndrome in hop shoots placed in culture filtrates of Verticillium albo-atrum was not related either to the pathogenicity of the fungus strain or the the wilt tolerance of the hop variety.

512. WHALEY, W. G. and J. KEPHART. Effect of gibberellic acid on growth of maize roots. Science 125: 234. 1957.

Gibberellic acid was added to nutrient solutions in which excised apical 10-mm segments of maize roots were grown for 24 hours. The primary roots of one line were unaffected by the gibberellic acid at the concentration (0-20 μg). Those of the other line and of the hybrid were significantly stimulated by the acid in 10 μg per ml.

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513. BARTON, R. Germination of oospores of Pythium mamillatum in response to exudates from living seedlings. Nature 180: 613-614. 1957.

Oospores of Pythium mamillatum on glass fibre tapes were stained in phenolic rose bengal and buried for 3 days in garden soil beneath 2- to 5-day-old turnip seedlings. Germination by germ-tube formation occurred in scattered areas on each tape, suggesting stimulation in proximity to the roots. Oospores in soil without seedlings did not germinate. Oospores were stimulated by germinating turnip seeds in distilled water in Petri dishes, even when the seedlings and tapes were separated by filter paper. When turnip seedlings were grown for 7 days in water the exudate solution, concentrated by freeze-drying, was shown to increase germination.

514. BECK, S. D. and J. F. STAUFFER. The European corn borer Pyrausta nubilalis and its principal host plant. III. Toxic factors influencing larval establishment. Ann. Ent. Soc. Am. 50: 166-170. 1957.

Corn plant tissues contain two or more toxic chemicals which inhibit the growth of a number of insects, fungi, and bacteria.

515. COLEY-SMITH, J. R. and C. J. HICKMAN. Stimulation of Sclerotium germination in Sclerotium cepivorum. Nature 180: 445. 1957.

Sclerotia of the fungus germinated 60 to 92 percent in soil containing onion seedlings, while germination of 0 to 15 percent was obtained in soil without onions. Germination was 100 percent when sclerotia were placed in contact with any part of onion roots which had been previously damaged by needle pricking. The addition of water extracts of roots of onion, shallot, and leek also had a marked stimulatory effect on the germination of sclerotia in soil. No germination occurred, however, with extracts of cabbage, brussels sprouts, or barley roots, or when distilled water alone was used.

516. EBERHARDT, F. and P. MARTIN. (The problem of root excretions and their importance in the mutual relationships between higher plants.) (English summary) Z. PflKrankh. 64: 193-205. 1957.

The liberation of fluorescent compounds by roots of Lolium, Nigella, and Papaver seedlings was studied by means of paper chromatography. It was concluded that true root secretions play only a minor part in the mutual interactions of plants growing in association with one another.

517. JACKSON, R. M. Fungistasis as a factor in the rhizosphere phenomenon. Nature 180: 96-97. 1957.

Conidia of Gliocladium roseum and Paecilomyces marquandi (on glass slides coated with 2 percent agar, 0.5 percent peptone) were unable to germinate when introduced into fresh fertile soil, but when pea seedling roots came into contact with the slides the conidia germinated. Similar results were obtained with conidia of Fusarium solani. The stimulation of germination in previously inhibited fungus spores is probably due to a root exudate, and would contribute to the relative abundance of fungi on and near roots as compared with in soil at a distance from roots.

518. KERR, A. and N. T. FLENTJE. Host infection of Pellicularia filamentosa controlled by chemical stimuli. Nature 179: 204-205. 1957.

The stimulation of Pellicularia filamentosa by exudates from radish seedlings was investigated. The only strain of the organism that showed a marked response to the exudate was the one that was pathogenic to radish. It was concluded that the attachment to, organization on, and penetration of a host by the radish strain is governed by the nature of the cuticle surface, and by a diffusible substance excreted onto the surface by the underlying cells.

519. KUC, J. A biochemical study of the resistance of potato tuber tissue to attack by various fungi. Phytopathology 47: 676-680. 1957.

Cephalothecium roseum and Myrothecium verrucaria, nonpathogenic to potato tubers, are inhibited by extracts of potato peel. M. verrucaria, however, is capable of rotting peeled tuber and is not inhibited by extracts of incubated tuber tissue, either inoculated or noninoculated.

520. LOOMIS, R. S., S. D. BECK and J. F. STAUFFER. The European corn borer, Pyrausta nubilalis and its principal host plant. V. A chemical study of host plant resistance. Plant Physiol. 32: 379-385. 1957.

A corn borer-inhibitory substance, 6-methoxy-2(3)-benzoxazolinone, was isolated from corn plants. This substance also had antifungal properties (inhibited Penicillium chrysogenum.)

521. MENON, R. and L. SCHACHINGER. Die Rolle des Phenols bei der Widerstandsfahigkeit von Tomatenpflanzen gegen Infektionen. (The role of phenol in the resistance of tomato plants to infections.) Ber. dtsch. bot. Ges. 70: 11-20. 1957. (Rev. Appl. Mycol. 36: 504. 1957.)

The content of polyphenoloxidase in tomato leaves and shoots is increased after infection with Fuarium lycopersici, and is greater in resistant than in non-resistant varieties. Infection increases the total phenol content of resistant, but not that of non-resistant varieties. It was concluded that the phenols cannot be responsible for wilting. Only one phenol was detected by paper chromatography.

522. NUTMAN, P. S. Studies on the physiology of nodule formation. V. Further experiments on the stimulating and inhibitory effects of root secretions. Ann. Bot. N.S. 21: 321-327. 1957.

The influence of root secretions on the nodulation of clover and lucerne in agar culture is examined. Root secretions are shown to have two effects: nodulation of the seedling is induced at an earlier stage (stimulation), but takes place at a reduced rate (inhibition).

523. SPENCER, D. M., J. H. TOPPS and R. L. WAIN. Fungistatic properties of plant tissues. I. An antifungal substance from tissues of Vicia faba. Nature 179: 651-652. 1957.

Segments of the stems and roots of broad bean were found to exert a marked inhibitory effect on the growth of Aspergillus niger. The properties of the antifungal extract indicated that the substance is phenolic but not a tannin. Some evidence was obtained that the substance is not present in intact broad bean plants but is produced in the tissues in response to wounding. The greatest activity occurred in the lower part of the stem and the upper segments of the primary root.

524. VIRTANEN, A. I., P. K. HIETALI and O. WAHLROOS. Antimicrobial substances in cereals and fodder plants. Arch. Biochem. and Biophys. 69: 486-500. 1957.

The active factor in the pressed juice of green rye seedlings was isolated and identified as 2(3)-benzoxazolinone. It had strong antifungal activity against Fusarium nivale and Sclerotinia trifoliorum. An antifungal factor was isolated from young wheat plants and maize plants, and was found to be 6-methoxy-2(3)-benzoxazolinone. Antifungal factors were isolated from alfalfa and red clover and that in clover was found to be an aromatic phenol. In potato leaves chlorogenic acid inhibited Phytophthora infestans. Antifungal activity was found in all the cultivated plants examined.

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525. BORNER, H. and B. RADEMACHER. (Self-incompatibility of flax.) Z. Pfl. Ernahr. Dring 76: 123-132. 1957.

Flax grown in nutrient solution in which flax has previously been grown exhibits at 26 days a decrease in shoot dry weight and root and shoot length.

No pathogenic microorganisms appear which could explain the results.

526. FORSTER, RITA. (Influence of tannins on germination and growth of higher plants.) Beitr. Biol. Pflanz. 33: 279-311. 1957. (Chem. Abstr. 51: 14026 (a). 1957.)

Root growth of Sinapis was more strongly inhibited than that of Lepidium; the action of gallic acid was four times greater than that of tannin.

527. HIRAYOSHI, I., S. KURODA and K. NISHIKAWA. (Growth-inhibiting substance produced by plants. I. Biological tests on the inhibitory substance extracted from water culture media.) Kagaku (Science) 27: 92-93. 1957. (Chem. Abstr. 51: 14905 (d). 1957.)

Water culture medium used for Lactuca sativa, Solanum lycopersicum, and S. melongena was concentrated and fractionated into acidic, phenolic, and neutral fractions. The fractions inhibited the germination of certain seeds.

528. JONES, M. B., J. W. FLEMING and L. F. BAILEY. Cyanide as a growth-inhibiting substance in extracts of peach leaves, bark and flower buds. Proc. Am. Soc. hort. Sci. 69: 152-171. 1957.

Extracts from buds collected at different times of the year caused inhibition of elongation in pea sections. Different amounts of cyanide were recovered from peach buds, twig bark, leaves, and root bark. The inhibition caused by extracts from the first three of these was comparable to that caused by a sodium cyanide solution containing an equal amount of CN, and that caused by the extract from peach root bark was greater than that induced by the sodium cyanide solution. Removal of CN from the extracts resulted in loss of inhibition induced.

529. KOMMEDAHL, THOR. Quack grass can be toxic to crop seedlings. Down to Earth 13: 4-5. 1957.

Quack grass rhizomes, foliage and seeds can be toxic to alfalfa and flax seedlings and to a lesser degree to wheat, oat, and barley seedlings.

530. KOMMEDAHL, T. and J. B. KOTHEIMER. The role of quack grass in root rots of cereals. (Abstr.) Phytopathology 47: 21. 1957.

Seedling stands of barley, oats, wheat, and corn were reduced substantially following inoculation in the greenhouse with species of Curvularia, Fusarium, Gibberella, and Helminthosporium that were isolated from rhizomes of quack grass. The addition of ground autoclaved rhizomes to soil increased severity of damage.

531. KOMMEDAHL, T., A. J. LINCK and J. V. BERNARDINI. The toxic effect of quack grass on growth of alfalfa. (Abstr.) Phytopathology 47: 526. 1957.

The addition to soil of dried rhizomes from quack grass resulted in severe stunting and chlorosis of alfalfa seedlings, reduction in stand of alfalfa, and delay in germination of alfalfa seeds.

532. Le TOURNEAU, D. and H. G. HEGGENESS. Germination and growth inhibitors in leafy spurge foliage and quack grass rhizomes. Weeds, New York, 5: 12-19. 1957.

Aqueous extracts of Euphorbia esula foliage and Agropyron repens rhizomes inhibited root growth of pea and wheat seedlings germinated in Petri dishes.

533. MANN, H. H. and T. W. BARNES. Report of the Rothamsted Experimental Station for 1956. 280 pp. 1957. (Rev. Appl. Mycol. 36: 816. 1957.)

Pot experiments suggest that "sick" clover soils indicate the presence of a toxic substance, and addition of 10 percent animal charcoal to such soils results in normal growth of clover.

534. MARTOSH, L. (Influence of a metabolite of the cotyledons on the growth of seedlings of leguminous plants.) Fiziol. Rastenir 4: 150-158. 1957. (Chem. Abstr. 51: 16744 (i). 1957.)

Experimental evidence confirms the opinion that trypaflavine is an inactivator of nucleic acid. Introduction of 400 γ of trypaflavine after 3 days of germination of the seed strongly slows down stem growth, inhibits lateral root formation, and causes a decrease in the dry weight of separate parts of the plants.

535. MASSART, L. (Inhibitors of germination of sugar-beet roots and other dry fruit and seeds.) Biokhimiya 22: 417-420. 1957.

Sugar-beet roots contained p-hydroxybenzoic, vanillic, p-coumaric, and ferulic acids. These acids, particularly the last two, impeded the germination of Lepidium sativum.

536. MIYAMOTO, T. Germination inhibitor in sugar-beet seed balls. Michigan Agr. Expt. Sta. Quart. Bull. 39: 578. 1957.

The seed coats of sugar beet and beet spinach contained sufficient oxalic acid to inhibit germination. It is unlikely that NH_3 is the active inhibitor.

537. NEWTON, W. The utilization of single organic nitrogen compounds by wheat seedlings and by Phytophthora parasitica. Can. J. Bot. 35: 445-448. 1957.

d-alanine and the optical isomers of leucine exerted toxic effects on wheat seedlings growing under aseptic conditions.

538. RADEMACHER, B. Die Bedeutung allelopathischer Erscheinungen in der Pflanzenpathologie. (The significance of allelopathic phenomena in plant pathology.) Z. PflKrankheit. 64: 427-439. English summary. (Rev. Appl. Mycol. 36: 774. 1957.)

Over 100 contributions to the literature were consulted in this survey of allelopathy (defined as the influence exerted by one plant on another by metabolic products, either emerging from the living plant or released by its dead residues) in relation to non-parasitic disorders.

539. SIEGEL, S. M. Growth- and enzyme-inhibiting properties of bean seed extracts. Plant Physiol. 32: 151-152. 1957.

Seed coat components may act as growth inhibitors and it is possible that phenols present either interfere directly with protein synthesis or are first converted into highly toxic quinonoid substances by endogenous tissue peroxidase. Tests with flax seed show inhibition of germination, root elongation, fresh weight increase, protein synthesis and peroxidase and phenolase formation. Root discoloration was observed and some of the seed coat phenols were found to serve as peroxidase substrates.

540. STENLID, GORAN. A comparison of the toxic effects of some sugars upon growth and chloride accumulation in young wheat roots. Physiologia Plantarum 10: 807-823. 1957.

From the studies it was difficult to decide if the sugars (galactose, mannose) are really toxic or only unsuitable as a carbon source, as the roots are dependent on externally supplied carbohydrates. Root growth in young wheat seedlings grown in nutrient solution (in the dark) is inhibited 50 percent by mannose, galactose, glucosamine, and 2-disoxy-D-glucose.

541. WARING, P. F. and H. A. FODA. Growth inhibitors and dormancy in Xanthium seed. Physiol. Plantarum 10: 266-280. 1957.

Seeds of Xanthium pennsylvaniarum contain two water-soluble growth inhibitors, which can be separated by paper chromatography. These inhibitors do not occur in other parts of the plant. The inhibitors accumulate during development of the embryo and disappear rapidly during germination.

542. HARRISON, B. D. Studies on the host range, properties, and mode of transmission of beet ringspot virus. Ann. Appl. Biol. 45: 462-472. 1957.

An apparently undescribed mechanically transmissible virus, beet ringspot virus (BRV), has been found to occur naturally in Scotland in sugar beet, turnip, swede, potato and many kinds of weed plants. When sugar beet seedlings were grown in virus-containing soil, BRV was first detected in their roots. Soils from five localities were found to contain BRV.

543. SMITH, FRANK H. and FRANK P. McWHORTER. Anatomical effects of tomato ringspot virus in Vicia faba. Am. J. Bot. 44: 470-478. 1957.

The cucumber strain of tomato ringspot virus causes necrosis of the inoculated leaves of Vicia faba. From these infected leaves the virus moves into the stem and downwards into the roots. As the necrosis progresses downward it follows the vascularization but does not at first involve the conducting tissues. Instead, the necrosis progresses downward in the parenchyma tissue external to the phloem, then spreads laterally through the pith and cortex. Necrosis proceeds downward and laterally in the cortex of the radicle. The virus increases the susceptibility of V. faba roots to soil fungi. Species of Pythium and Fusarium may invade and destroy the root tips before the tips are killed by the virus.

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